PROCEEDINGS

OF THE

AMERICAN PHILOSOPHICAL SOCIETY,

HELD AT PHILADELPHIA, FOR PROMOTING USEFUL KNOWLEDGE.

VOL. XXX. DECEMBER, 1892. No. 139.

TABLE OF CONTENTS.

PAGE

On the Mutual Relations between the Orbits of Certain Asteroids. *By Daniel Kirkwood* 269

Further Notes on the Betoya Dialects; from Unpublished Sources. *By Daniel G. Brinton, M.D., LL.D.* 271

On the Phylogeny of the Vertebrata (with two cuts). *By Prof. E. D. Cope* 278

On Some Points in the Kinetogenesis of the Limbs of Vertebrates. *By Prof. E. D. Cope* 282

On False Elbow Joints (with two plates). *By Prof. E. D. Cope.* 285

Stated Meeting, September 2, 1892 291

Stated Meeting, September 16, 1892 300

Stated Meeting, October 7, 1892 303

Stated Meeting, November 4, 1892 307

Stated Meeting, November 18, 1892 309

Stated Meeting, December 2, 1892 312

Stated Meeting, December 16, 1892 313

The Etrusco-Libyan Elements in the Song of the Arval Brethren. *By Daniel G. Brinton, M.D., LL.D.* 317

☞ It is requested that the receipt of this number be acknowledged.

☞ In order to secure prompt attention it is requested that all correspondence be addressed simply "To the Secretaries of the American Philosophical Society, 104 S. Fifth St., Philadelphia."

PUBLISHED FOR THE AMERICAN PHILOSOPHICAL SOCIETY

BY

MACCALLA & COMPANY,

NOS. 237-9 DOCK STREET, PHILADELPHIA.

EXTRACT FROM THE LAWS.

THE HENRY M. PHILLIPS' PRIZE ESSAY FUND.

Miss Emily Phillips, of Philadelphia, a sister of Hon. Henry M. Phillips, deceased, presented to the American Philosophical Society, held at Philadelphia for Promoting Useful Knowledge, on October 5, 1888, the sum of five thousand dollars for the establishment and endowment of a Prize Fund, in memory of her deceased brother, who was an honored member of the Society. The Society, at a stated meeting, held October 5, 1888, accepted the gift and agreed to make suitable rules and regulations to carry out the wishes of the donor, and to discharge the duties confided to it. In furtherance whereof, the following rules and regulations were adopted by the Society at a stated meeting held on the seventh day of December, A.D. 1888:

First. The Prize Endowment Fund shall be called the "Henry M. Phillips' Prize Essay Fund."

Second. The money constituting the Endowment Fund, *viz.*, five thousand dollars, shall be invested by the Society in such securities as may be recognized by the laws of Pennsylvania, as proper for the investment of trust funds, and the evidences of such investment shall be made in the name of the Society as Trustee of the Henry M. Phillips' Prize Essay Fund.

Third. The income arising from such investment shall be appropriated as follows:

(*a*) To making public advertisement of the prize and the sum or amount in United States gold coin, and the terms on which it shall be awarded.

(*b*) To the payment of such prize or prizes as may from time to

Received *of the American Philosophical Society, Proceedings No. 139.*

Name, ...

Address, ...

N. B.—Please detach this page when signed, and return, prepaid, to the Secretaries.

PROCEEDINGS

OF THE

AMERICAN PHILOSOPHICAL SOCIETY,

HELD AT PHILADELPHIA, FOR PROMOTING USEFUL KNOWLEDGE.

VOL. XXX. DECEMBER, 1892. No. 139.

On the Mutual Relations Between the Orbits of Certain Asteroids.

By Daniel Kirkwood, Riverside, Cal.

(Read before the American Philosophical Society, September 2, 1892.)

The present writer, several years since,* called attention to the fact that in some parts of the asteroid zone the orbits of particular members have a striking resemblance to each other. These significant coincidences have been regarded by astronomers as worthy of study, and, in addition to the binary and ternary clusters pointed out by the writer, others have been designated by Tisserand,† of Paris, and by Monck, of Dublin.‡ These groups, according to the former, cannot be regarded as chance arrangements. "A glance at the list," says Mr. Monck, "will show that the resemblance frequently extends beyond a single pair and embraces what may be called a family—a circumstance which is known to occur in the case of comets also." The writer's list (which might be extended) is as follows:

GROUPS OF ASTEROIDS.

	NAMES.	a	e	i		π	
I.	Huberta ...	3.4586	0.1103	6°	16′	329°	45′
	Hermione ..	3.4535	0.1255	7	36	357	36
II.	(106) Dione.....	3.1670	0.1788	4	38	25	57
	(104) Clymene ...	3.1560	0.1407	2	53	62	30
	(171) Ophelia....	3.1554	0.1142	2	33	148	31
	(62) Erato	3.1241	0.1756	2	12	39	0
	(287) Silesia.....	3.1190	0.1217	3	40	65	16
	(212) Medea	3.1157	0.1013	4	16	56	18
	(86) Semele.....	3.1015	0.2193	4	47	29	10
	(305)	3.0973	0.1927	4	26	104	37
	(345) Vera.....	3.0966	0.1975	5	11	27	48
	(223) Rosa.....	3.0937	0.1206	1	59	106	35
	(268) Adorea.....	3.0853	0.1285	2	25	184	48

*1887. †Annuaire, 1891. ‡ *Sid. Mess.*, October, 1888, p. 334.

	Names.	a	e	i		π	
III.	(238) Hypatia....	2.9081	0.0876	12°	23′	28°	24′
	(191) Kolga.....	2.8967	0.0876	11	29	23	21
IV.	(1) Ceres	2.7673	0.0763	10	37	149	38
	(237) Cælestina ..	2.7607	0.0738	9	46	282	49
V.	(116) Sirona.....	2.7669	0.1433	3	35	152	47
	(278) Paulina	2.7575	0.1331	7	50	199	52
	(213) Lilaea.....	2.7563	0.1437	6	47	281	4
VI.	(206) Hersilia	2.7399	0.0389	3	46	95	44
	(203) Pompei	2.7376	0.0587	3	13	42	51
	(160) Una.....	2.7287	0.0624	3	51	55	57
	(301) Bavaria	2.7258	0.0660	4	53	24	4
VII.	(97) Clotho	2.6708	0.2550	11	46	65	32
	(3) Juno.....	2.6683	0.2579	13	1	54	50
VIII.	(249) Asporina...	2.6947	0.1050	15	38	256	6
	(218) Bianca	2.6653	0.1155	15	13	230	14
IX.	(66) Maia.....	2.6454	0.1758	3	6	48	8
	(37) Fides	2.6440	0.1750	3	7	66	26
X.	(193) Ambrosia ..	2.5758	0.2854	11	38	70	52
	(134) Sophrosyne	2.5647	0.1165	11	36	67	33
XI.	(79) Eurynome .	2.4436	0.1945	4	37	44	22
	(19) Fortuna....	2.4415	0.1594	1	33	31	3
XII.	(249) Ilse.....	2.3793	0.2195	9	22	14	16
	(115) Thyra.....	2.3791	0.1939	11	35	43	2
	(84) Clio	2.3629	0.2360	9	40	339	20

Note.—a, e, i and π represent the distances, eccentricities, inclinations and perihelia respectively.

Remarks.

1. The second cluster has eleven known members, the average inclination being about 3° 35′, that is, no one differs from the mean as much as 2°. Of the other groups, several are not less striking in the closeness of their relations.

2. When the earth, as well as Mars itself, was yet a part of the solar atmosphere, these individual planetoids were starting on the paths prescribed them. Into how many nebulous fragments they may have been subdivided, and to what extent these ramifications may yet be traced, let the astronomer of the future inquire.

Further Notes on the Betoya Dialects; from Unpublished Sources.

By Daniel G. Brinton, M.D., LL.D.

(*Read before the American Philosophical Society, October 7, 1892.*)

Last spring the Librarian of the Lenox Library, Mr. Wilberforce Eames, called my attention to a manuscript in that collection, with the following title: "*Arte de lengua de las Misiones del Rio Napo de la Nacion Quenquehoyos, y idioma general de los mas de ese Rio, Payohuates, Genzehuates, Ancoteres, Encabellados. Juntamente tiene la doctrina Christiana en dicha lengua y en la del Ynga. Al remate.*"

It is a duodecimo of seventy-five leaves, complete, clearly written, and dated at the close "Mayo 4 de 1793." It begins with a brief exposition of the grammatic principles of the language, and follows with a vocabulary of about 1700 words, covering 34 leaves. At the close are versions of the Doctrina in the same tongue and in the Kechua. Through the kindness of Mr. Eames I had opportunity to examine the MS. carefully, and to make from it a number of extracts which enable me to present the subjoined sketch of the language.

The stock to which it belongs is one concerning whose grammatic character the material hitherto available has been quite meagre. In a former contribution to the Proceedings of this Society I have shown that what are distinctively known as the Rio Napo dialects belong to the Betoya linguistic stock, and are affiliated with others which can be traced over ten degrees of latitude, from 3° south to 7° north latitude.

The dialect presented in the present MS. is a comparatively pure and well-marked member of the stock, and is nearly related to the Correguage of the head waters of the Caqueta and Putumayo rivers, of which vocabularies have been published by different travelers.

By Hervas, and a number of other writers who have copied from him, these Rio Napo dialects have been classed with the Zaparro stock, with which they have no relationship whatever.

Nouns.

Nouns are usually employed with suffixes denoting relation which allow them to be arranged with a resemblance to declensions.

Following the analogy of the Latin Grammar, the author presents five such declensions of masculine and feminine nouns, with some variations for neuters. The endings of his oblique cases are as follows:

Case Endings.

Declensions.	1.	2.	3.	4.	5.
Genitive,	*co,*	*que,*	*ye, que,*	*ye,*	*he.*
Dative,	*ni,*	*ni,*	*ni, pi,*	*ni,*	*ni.*
Accusative,	*nam,*	*te,*	*te,*	*te,*	*te.*
Ablative,	*pi, pio, nam,*	*pi, pio,*	*pi, pio, ani,*	*pi, are, ani,*	*pi, na.*

The plural is formed by reduplication, or by the general termination *zea* or *cea*, which means "all;" or *guati;* or, for inanimate objects, *na.*

The ablative suffix, *pi* or *pio*, is instrumental; *are* signifies accompaniment.

The termination *na or nam* of the accusative indicates motion.

The following example of a noun of the first declension will be a sufficient illustration.

Sigua-ye—music.

	Singular.	Plural.
Nom.,	*siguaye,*	*siguayezea.*
Gen.,	*siguaco,*	*siguaqunazea.*
Dat.,	*siguaconi,*	*siguanizea.*
Acc.,	*siguaconam,*	*siguatezea.*
Voc.,	*siguaye,*	*siguaquenazea.*
Abl.,	*siguayepi,*	*siguapizea.*

Gender.

This language is remarkable for the well-defined distinction it presents between masculine and feminine forms. The feminine termination is *o*, which, by assimilation, may also modify other vowels. It is present in both nouns, adjectives and pronouns; *e. g.:*

He is a bad man, *ha quaque pain.*
She is a bad woman, *y-o coaco romio.*

The masculine and feminine forms can also be applied to inanimate objects.

This thing (masc.), *i-ie.*
This thing (fem.), *i-o.*
That thing (masc.), *he-y.*
That thing (fem.), *he-co.*

There is no regular termination to nouns which distinguishes the

animate from the inanimate classes. Nevertheless, such a distinction is clearly recognized in the tongue; and also the distinction between rational and irrational beings.

The termination *pi* indicates animate rational beings, singular or plural; as, *pain pi raye*, some people are coming.

The termination *guati* or *huati* (*guay* or *huay*), is the plural for animate beings, whether rational or irrational, masculine or feminine; as, *Quito huati*, people of Quito, *romi-huati* or *nomio guay*, womenfolk.

The plural termination for inanimate beings is *na*; as, *zonque-na*, the trees.

Other plurals are irregular.

Pronouns.

The same forms serve for both personal and possessive pronouns.

I, my,	*ye* or *ye-pi*.
Thou, thine, thy,	*mve*.
Thou thyself,	*mue-repa*.
That one (masc.),	*ha*, or *an*, or *haon*.
That one (fem.),	*haon*, or *aon-pi*.
She,	*y-o*.
We, our (masc. and fem.),	*may*, or *yeque*, or *yequepi*.
You, your (masc. and fem.),	*musa*.
They, their (masc. and fem.),	*imbue*.

Examples:

My clothing, *ye-ca*.
Thy wife, *mue-rexo*, or *mue-nexo* (from *exhe*, wife).
It is my son, *yeque çiva-e*.

Numerals.

1, *Tey* (masc.); *teo* (fem.); only one, *teirepa* (one itself).
2, *Cayapa*.
3, *Toazumba*.
4, *Cajezea* (2 with plural termination).
5, *Teente* (hand).
6, *Teyentetey* (hand + 1).
7, *Teyente cayapa* (hand + 2).
8, *Teyente toazumba* (hand + 3).
9, *Teyente caesea* (hand + 4).
10, *Caya ente*, or *caya huenã* (two hands).
11, *Caya ente-tey* (two hands + 1).
15, *Toazumba-ente* (three hands).
16, *Toazumba-ente-tey* (three hands + 1).
20, *Caesea ente* (four hands).

Particles.

Like other languages of this class, much of the force of the expression depends on the use of certain particles, employed as prefixes, suffixes or infixes. The following examples will suffice:

Hua, causative, as, I smell (I observe an odor), *ye ezi*.
I smell (I cause an odor), *ye huazi*.
Eagi, expresses desire or wish.
Cono, to drink; *cono-eagi*, I want to drink.
Caye, has an imperative sense.
Vere, to cut; *yere-e-caye*, to order to cut.
Mapay, indicates negation.
He comes, *rayge*; he comes not, *ray-mapay-ge*.
Que, co, ne, ni are particles of interrogation.

Terms of Consanguinity.

A number of these are given, but their distinction is not well explained.

My father, *ye-aque*, or *hucaque*, or *aqma*.
My mother, *ye-aco*, or *hucaco*, or *acoma*.
My son (child), *ye-mamaque*, fem. *e-mamaco*; or *ye-zenque*, fem. *ye-zenco*.
My grandfather, *ye co-e*, or *nenco-e*.
My grandmother, *ye-coe-o*, or *nenco-o*.
My uncle, *ye-pereque*.
My aunt, *ye-pueco*.

On the use of these the author adds the following note:

"Lo comun es que los tios á sus sobrinos dicen hijos, y los sobrinos padres los suegros hijos los hermanos tios y cunados de hermanos."

Verbs.

Conjugation of the verb oye, *to love*.

Present.

I love, *ye oye*.
Thou lovest, *oye mue*.
He loves, *an oyni*.
We love, *may oniŭ*.
You love, *musa oy'ye*.

Imperfect.

I loved, *ye ouha*.
Thou lovedst, *mue ouhue*.
He loved, *heque ouha*.
We loved, *may ouahue*.
You loved, *musa oyci seaha-e*.
They loved, *an guati ou huapa*.

Preterit.

I have loved, *yeohue*.
Thou hast loved, *mue oysiqueco*.
He has loved, *ian oysi queae*.
We have loved, *may oysi queae*.
You have loved, *musa oysi queae*.
They have loved, *an guati oysisea-e*.

PLUPERFECT.

I had loved, *ye oy paa*, etc.

FUTURE.

I shall love, *oysi'ye.*	We shall love, *onui yeque.*
Thou wilt love, *oygen mue.*	You will love, *oini musa.*
He will love, *oysipi yan.*	They will love, *oycipi yan guati*

IMPERATIVE.

Love thou, *oyni'mue.*

Verbs can be formed from nouns or adjectives by adding the particle *gi;* as,

Smoke, *pia;* it smokes, *piagi.*

THE LORD'S PRAYER.

1. *May aque matemote payque.*
   Our father heaven-at is there.
2. *Mue mami oisique pae.*
   Thy name be sacred.
3. *Mue payquero rauyena.*
   Thy kingdom come.
4. *Mue yeye neçique paye.*
   Thy will on earth rule.
5. *Omaje stohuay matemote nesique paye.*
   Even as thy holiness in heaven (and) on earth rules.
6. *Aunre yure omansepi mayni insigen.*
   Give to eat to-day as to us each day.
7. *May coayrosere huaneyeyen.*
   Our sins pardon.
8. *Omaje may huanienuu.*
   Even as we pardon.
9. *Tin huati mainre coayocere.*
   Those who us sin against.
10. *Coayoyete mainre tantahe.*
    Doing evil us keep from.
11. *Zea coayete mainpi pirahe.*
    All evils us from deliver.

Notes.

1. *Matemote* appears to be a locative reduplicated form from *emue*, above; *payque*, to be in a place.

3. *Payquero*, from *pain*, man, master; *quero*, place or town; *rauyena*, from *raye*, to come.

4. The phrase "Creator of heaven and earth" is translated *matemote yejare nesiquete.*

5. The words *neçique paye* seem to be repeated by error.

6. *Aunre*, from *aunne*, to give to eat, derived from *anye*, to eat; *insigen*, from *sia*, day; another word for day is *munçe;* both are evidently from *nçe* or *ense*, sun.

7. *Coayocere*, sins, from *coa* or *qua*, bad.

8. *Huanienuu;* the vocabulary gives *huaneyeye*, to pardon.

10. *Coayoye* or *coayoze*, evils; *coayeteyoye*, to commit sin.

11. *Pirahe*, deliver; so in the Signarse, "Deliver us, O Lord," *mainpi pirahe may aque Dios.*

The following is the version in "Encabellada," given from the Mezzofanti Collection in Teza's *Saggi Inediti de Lingue Americane* (Pisa, 1868):

May ake matemote payque mue mami, oyeique paye mue paykero: mayni raygen mue yeye nezique paye exanie yexana, matemote yoygi. Zia omuncepi aunre mayni incigen: may quayeyocere guaniyenigen exanie may quayeyocehuatire guaniyenichañu: quayeyote maypi piraygen ziaqua quachacere mayni rebaygen.

It is evident that this is the same dialect, but a version by a different hand, in which a varied phraseology has at times been adopted.

Vocabulary.

Above, upon, *emue.*
Alive, living, *huaje.*
All, *zia*, or *ziaye*, or *zea.*
Ashes, *unta.*
Bad, *coa.*
  it is bad, *qua-gi.*
Beard, *zebi, zehue.*
Before, *yehua.*
Belly, *apue*, or *etapue.*
Below, *ōca, ocare, huehue.*
Bird, *pi-ha.*
Black, *neaque*, or *neaxaye.*
Blood, *zi-e.*
Blue, *pocoro.*
Body, *juru.*
Bone (of animals), *huay tarapue.*
  (of man), *pain tarapue.*
Boy, *zin* or *ziba-e.*
  (fem.) girl, *ziba-o.*
Bread, *haun.*
Breast, *cutihue.*
Brownish (morado), *cariri.*
Build, to, *enene.*
Burn, to, *oye*, or *eoye.*
Canoe, *yogue*, or *comu.*
Come, to, *raye*, or *rayge*, or *mane.*
Cotton, *yei*, or *yeg-y.*
Dance, to, *reroye*, or *nanuye*, or *nemcaye.*
Dead, *juyncique*, or *junçe.*
Deity, *ayreoque.*
Dog, *yay*, or *gho-pe*
Drink, to, *uncusi.*
Earth, land, *yexa.*

Ears, *caxoro.*
Eat, to, *anye.*
Egg (raw), *hua jezia.*
(cooked), *quaco jezia.*
Enemy, *juajo pain*, or *guato pain.*
Eyes, *nañqua*, or *nañcoca.*
Face, *zi-a.*
Father (spiritual), *pairi.*
(natural), *jaque*, or *vacaque.*
Feather, *ca.*
Female, *romio*, or *nomio.*
Finger, *monô.*
Fire, *toa.*
to light a fire, *toare zoanŭ.*
Flesh, meat, *huay.*
Flower, *zaza.*
Flute, *hetuhue.*
Foot, *nenye*, or *nencaye.*
Foretell, to (by magic), *viniare caye.*
Forehead, *ziatarapue* (see "Face," "Belly").
Go, to, *zaiye.*
Green, *huaxe.*
Guacamayas, *ma* (= red, from the color of the plumage).
Hamack, *ham*, or *hamxe.*
Hand, *hente.*
right hand, *heja gente.*
left hand, *ari gente.*
Head, *ziumbue.*
Hear, to, *hachaye.*
Heart, *ahue.*
of animals, *zeme.*
of inanimate things, *joyo.*
Heat, burning, *nçe.*
Horn, of animals, *xexo.*
as a wind instrument, *ruruhue.*
Hot, *raca.*
House, *hue.*
new house, *mama hue.*
old house, *punca hue.*
to build a house, *hue enene* (see "To make").
Husband, *eghe*, or *paque*, or *yohemue.*
Image, idol, *toyace.*
Iron, *quena.*
Jar, *qua-curo*
Kill, to, *huaye.*
Know, to, *quachaye.*
Lake, lagoon, *zitara*, or *copora*, or *guayra.*
Lance, spear, *huy.*
Light, *toa*, or *zeunze toa* (= fire).
Lion, *mayay.*
Maize, *bea*, or *hueha.*
young, *huinia hueha.*
pounded, *cata vea.*
roasted, *jarose vea.*
Make, to (hacer), *yoye*, or *nene.*
Male, *emue.*
Man, *pain*, or *hain.*
Master, *paque.*
Mat, *punti.*
Milk, *oge.*
Moon, *nianâg*, or *pain.*
the moon shines, *nâneg meagi.*
full moon, *nânâ tubetotagui.*
Mother, *aco*, or *bucaco*, or *hacoma*, or *jacore.*
Mouth, *heopo.*
Nail, of finger, *coo.*
Name, *mami.*
Name, to, to call, *cuymiane.*
Navel, *zumjupue.*
New, *mama.*
Night, *nâmi.*
Nose, *uncuepue*, or *aqueeze*, or *un-eye.*
Old man, *aypue.*
Old woman, *a-yo*, or *punq-yo.*
Pardon, to, *huaneyeye*, or *tauye.*
Parrot, *huee.*
People, person, *pain.*
hostile people, *guato pain.*
friendly people, *voi pain.*
Perish, to, *chaye*, or *xuxu-chaye*
Place, *rovue*, or *quero*, or *taco*, or *rare.*
Poor, *yehui.*
Pretty, *ayreo*, or *aydeoge.*

Rain, *ôco* (= water).
it rains, *ôcooi*.
Red, *ma*.
bright red, *malay*.
Relation, male, *xoyque*.
female, *xoyco*.
Road, *ma-a*.
Round, *cahua*.
Salt, *hazi*, or *anzi*, or *quena ocha*, or *o-a*, or *teve*.
to salt, *anzi pegenaye*.
Scorpion, *puny*.
See, to, *inaye*.
Seed, grain, *ca*.
Servant, slave, *joya*.
Shaman, priest, *viniapain* (see "To foretell").
Shoulders, *ete*.
Silver, *rehua*.
Sin, *coa-yoye* (see "Bad").
Sleep, to, *cane*.
Smell, to, *yeye-ye*.
Small, little, *arimania*.
Smoke, *pia*.
Soul, *joyo* (see "Heart").
Spittle, *co-o*.
Spring, fountain, *oco renia* (see "Water").
Star, *manûco*.
the Pleiades, *vze po*.
Stick, *tarapue*.
Stone, *quena*.
Straw, *taya juinze*.
Sun, *nçe*, or *ense*.
the sun rises, *nçe nantagi*.
Talk, to, *n-caye*, or *cocacaye*.
speech or words, *caye*.
language, *coca*.
Thief, *naaque*.
Tiger, *ayro-yay* (see "Woods," "Dog").
Time, *rem*.
Tobacco, *mueto*.
in powder, *xea*, or *xena mueto*.
To-day, *yure*.
Tongue, the, *zemeno*, *zemeyo*.
Town, village, *quero*, or *taco*, or *raripue* (see "Place").
Turtle, *cohue*, or *puca*, or *taxeya*.
Urine, *cone*.
Water, *ôco*.
drinking water, *ocoraca*.
clear water, *cositaye oco*.
Weight, *requexi*.
to weigh in a balance, *cuencuesi*.
Wind, *tutu*.
Wish, to, *yeye*.
White, *poo*.
Woods, forest, *ayro*, or *mue*.
Yellow, *zeno*, *zonio*, or *paco*
Yesterday, *niamina*.

On the Phylogeny of the Vertebrata.

By E. D. Cope.

(*Read before the American Philosophical Society, October 7, 1892.*)

I have traced the origin* of the Mammalia to the Theromorous reptiles of the Permian epoch, for the following reasons. The latter include the Pelycosauria, Cotylosauria, Procolophonina and perhaps other orders. In both classes there is only one postorbital arch of the skull, and this is the zygomatic. In both (excepting Prototheria and Procolophonina†)

* Proceeds. Amer. Philos. Soc., 1884, p. 43.
† Seeley, Philos. Trans. Royal Soc., 1889, 269.

the coracoid element is of reduced size, and is coössified with the scapula. In both (except Cotylosauria) the capitular articulation of the ribs is intercentral. In both, the humerus has distal condyles and epicondyles, and there is an entepicondylar foramen in the Pelycosauria as in the lower Mammalia. The posterior foot is constructed in the Pelycosauria almost exactly like that of the Prototheria. The single occipital condyle of the reptiles is not found in the Mammalia, but in some of the Lacertilia (Uroplates, Gecco) there are two condyles, the median (basioccipital) portion of the single condyle being rudimental. The Pelycosauria could not, however, have given origin to the Prototheria, since in that subclass of mammals there is a well-developed coracoid. But in the Procolophonina this element is developed as in the Prototheria. Moreover, the Pelycosauria and the Procolophonina have the interclavicle, which is an element of membranous origin, while in the Prototheria we have the corresponding cartilage bone, the episternum. This element is present in the Permian order of the Cotylosauria, which is nearly related to the Pelycosauria. This order has, however, single-headed ribs, springing from the diapophyses, which is not usual in the Mammalia. But in some Cotylosauria the diapophyses are short, and in the Monotremata the postcervical ribs are single-headed, so this character may not prove an insurmountable one. It is evident that the Mammalia were derived from some type probably referable to a Permian reptilian order of the Theromorous series, although to which one is not yet known.

The Reptilia have been supposed by Hæckel to have taken their origin from the Batrachia. I have indicated that it is probable that the Batrachian order, which stands in this relation to the Reptilia, is the Embolomeri of the Permian epoch. This conclusion rests on the following considerations. The Reptilian order of the Cotylosauria approaches the Batrachia of the subclass Stegocephali in the overroofing of the posterior regions of the skull ; in the presence of vomerine teeth, and in the absence of obturator foramen of the pelvis. In some Cotylosauria (Diadectidæ) the stegocephalian intercalary bone of the skull is well developed. But in the Cotylosauria, the vertebral column consists mainly of centra, while in the Stegocephali it consists entirely or partly of intercentra. But in the Embolomeri the centra are well developed, and are larger than the intercentra anterior to the pelvis. Hence this is the only order of Stegocephali from which the Reptilia could have been derived.

Hæckel derived the Batrachia from the Dipnoi (Dipneusta), and I followed him in this belief, being strengthened in it by Huxley's ascription of an autostylic suspensorium of the mandible* to both divisions. This phylogeny is questioned by Pollard† and by Kingsley ‡ who would see the ancestry of the Batrachia in the Crossopterygian fishes on embryological grounds derived from a study of Polypterus. In support of their

* Proceedings Zoölogical Society of London, 1876, p. 59.

† Anatomischer Anzeiger, vi, p. 338, 1891.

‡ American Naturalist, 1892, p. 679. Kingsley would also derive the Dipnoi from Crossopterygia.

view I would cite the absence of the maxillary arch in the Dipnoi, and its full development in the Stegocephali, which are the ancestral Batrachia. The large development of the dorsal and anal fins in the Dipnoi is not favorable to the Hæckelian view; nor do the paired fins approach as nearly to the limbs of Batrachia as do those of some other fishes. It has been shown by Huxley that the suspensorium of the Batrachia is hyostylic in its earliest stages, and that it becomes autostylic at a later period of development. The Batrachia may then have originated from a hyostylic Teleostomous fish; *i. e.*, one with complete maxillary arch. Among Teleostomata we naturally look for forms with limbs which approach nearest the Batrachian type, and in which median fins are feeble or wanting. Such are the Rhipidopterygia, which include the families of Holoptychiidæ, Tristichopteridæ, Osteolepididæ, Cœlacanthidæ and perhaps some others. These families, except the last, abounded in the waters of the Devonian period, at the time when the ancestors of the Batrachia also

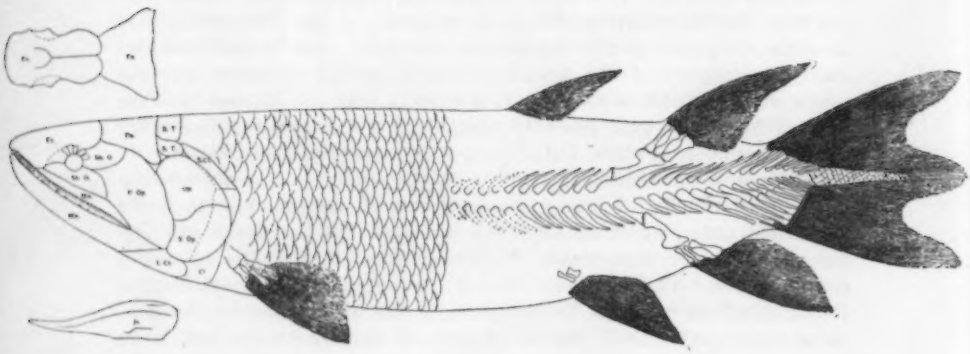


Fig. 1. *Eusthenopteron foordii* Whiteaves; ⅓ natural size. Devonian of New Brunswick. From Whiteaves.

existed. All of them agree in possessing the median fins of greatly reduced proportions, and the mesodermal or internal elements of the paired fins more like the limbs of the Batrachia than are those of any known fishes. The constitution of the superior cranial wall is a good deal like that of the stegocephalous Batrachia. The characters of the fins can be learned from the accompanying figure of the *Eusthenopteron foordii* Whiteaves, one of the Tristichopteridæ. The pectoral fin well-nigh realizes Gegenbaur's theory of the derivation of the Chiropterygium from the Archipterygium.

The question of the ancestry of the Batrachia cannot be considered to be yet settled.

The ancestral type of fishes is probably the Ichthyotomous order of the subclass of sharks (Elasmobranchii).* They are hyostylic, and have cranial

*Cope, Proceedings Amer. Philos. Soc., 1884, p. 585.

segmentation, the basioccipital element being conspicuous. The fins are all primitive, and those of all other types of fishes might have been derived from them. Opposed to this estimate of their relation to other vertebrates is the fact that they have not been yet found prior to the Carboniferous period. But our knowledge of the fishes of the Devonian is yet very imperfect. The types ancestral to the Pisces must have existed in the Silurian, and forms which may well have fulfilled this function have been discovered there. I refer to the Agnatha, which have been traced to the summit of the Devonian. The Silurian Agnatha are the Pteraspididæ, which display the lowest type, and the Cephalaspididæ, and these were succeeded by the Pterichthyidæ in the Devonian. There is a wide gap between these forms and any of the fishes, and nothing can be affirmed plausibly with regard to the phylogeny. There are superficial resemblances between the dorsal and ventral dermal scuta of the Pterichthyidæ and the Arthrodirous Dipnoi, but there is no considerable affinity between those divisions.

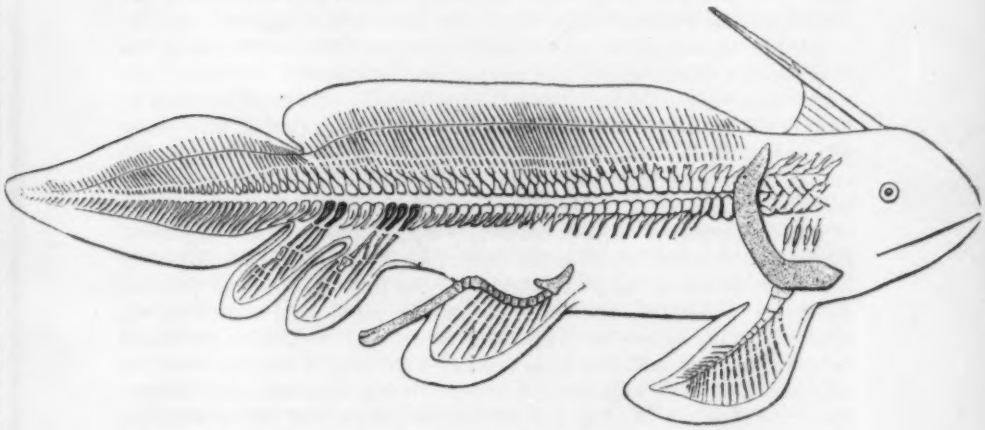


Fig. 2. *Xenacanthus decheni*, one of the Ichthyotomi; restored by Dr. H. E. Sauvage. From the Coal Measures of France.

The extinct Agnatha agree with the existing lampreys in the absence of lower jaw and pectoral (scapular) arch, and both must be traced, in accordance with Hæckel's phylogeny, to the Acrania, which is now represented by the amphioxus (genus Branchiostoma). This order is easily the ancestor of existing Vertebrata, and shows points of resemblance to both Tunicata and worms. It has been suspected by Dohrn to have undergone degeneration, which may have been the case, since this phenomenon is so abundantly exhibited by both Tunicata and worms. It is not difficult to believe with Kowelewsky, that the Acrania were derived from the Tunicata. Semper has suspected, on the other hand, that the ancestors of the Vertebrata are to be found in the Annelide worms.

On Some Points in the Kinetogenesis of the Limbs of Vertebrates.

By E. D. Cope.

(*Read before the American Philosophical Society, October 7, 1892.*)

The following paper is designed to supplement some omissions from my previous discussion of this subject in the memoir "On the Mechanical Causes of the Origin of the Hard Parts of the Mammalia."*

I. The Segmentation of the Chiropterygium.

The segmentation of the limbs in the Vertebrata is a simple mechanical problem. Paleontology and embryology concur in proving that the limbs originated in primitive folds in the external integument, and that their connection with the internal skeleton was of later accomplishment. At first free, they sought points of support on the skeleton, but did not lose their free mobility when this contact was attained. Appropriately to the mechanical conditions of rigidity and flexibility necessary to their use in a fluid medium, they were originally composed of slender rods which were segmented by interruptions at suitable points. The articulations of the fin rays of fishes have been made the subject of an interesting research by Ryder, who finds them to be fractures, due to flexures during motion in the water medium.† The limb of land vertebrates (the chiropterygium) was derived from one of the forms of fins (rhipidopterygium) of water vertebrates. This is the simple type of primitive fin displayed by the Paleozoic Teleostomi of the superorder Rhipidopterygia. Whether the subdivisions of the chiropterygium, the propodial, metapodial and phalangeal bones, etc., were divided from the primitive branches of the archipterygium, as held by Gegenbaur; or whether they have developed by sprouting from a simple axial series of segments, as held by Baur; or whether, as I have suggested, it is a derivation from the rhipidopterygian type of paired fin (Fig. 1, p. 280), is not yet decided. In either case, the limbs of the first land animals were segmented and flexible at the joints between the segments. The necessities of such limbs are twofold: first, to serve as supports when at rest or in progression; second, to be applied to the body in protection from enemies, or in aiding the functions of feeding, reproduction, etc. The first function requires principally mobility at the point of connection with the body. The second, flexibility at some point on the shaft of the limb. The two kinds of movements in question would conserve two principal points of flexure, and these would be for the fore limb, just what we find, the shoulder and elbow joints; and for the hind limbs, the hip and knee joints. The two median joints are directed in opposite ways, the elbow backwards and

* American Journal of Morphology, iii, 1889, p. 137.

† Proceedings of the American Philosophical Society, 1889, p. 547.

the knee forwards. This diversity is clearly due to the diverse positions of the functioning regions. The opposite extremities of the alimentary canal, the posterior including the exits of the urogenital organs, requires that the fore limbs should bend forwards, and the posterior limbs backwards. And the constantly recurring necessity for the exercise of these flexures must necessarily have developed the appropriate articulations in preference to all others. The terminal flexure, that of the wrist or ankle, has been evidently due to a similar mechanical cause; viz., the flexure due to pressure of the weight of the body on the terminal segments when in contact with earth. The distal segments are the most slender in all types, and least able to maintain a linear direction under pressure, hence, they have flexed easily and thus the line of separation between leg and foot had its origin.

II. The Origin of the Crests of the Humeral Condyles.

I have already pointed out (*op. cit.*) the kinetogenetic origin of the tongue and groove articulations in the Mammalia.

An excellent example is furnished by the elbow joint of the Quadrumana and Diplarthra. In the lower Mammalia, including the Carnivora (*op. cit.*, Pl. ix, fig. A), the distal end of the humerus presents a submedian groove which receives the ulna, and on the inner side of it, a more or less convex surface, which is applied to the head of the radius. The coronoid process of the ulna is narrow and its dense bounding walls impinge on the broad face of the humeral condyle in flexion and extension, and transfers to it the force of impact when the foot strikes the ground. In either case, strong pressure has been brought to bear on the humeral condyle and it has yielded to the denser body of the ulna, thus forming the groove in question. In such Mammalia, the effect of the head of the radius on the humeral condyle has been similar and in the same direction, *i. e.*, upwards. The dense edges of the former have impressed themselves on the latter, while the unsupported middle portion has yielded in the direction of gravity, and the result is what we find, *i. e.*, a cup-shaped surface of the head of the radius, and a convexity of the humeral condyle, adapted to it.

Among specializations of the elbow joint, I call attention to two. In the Quadrumana, the head of the radius, probably owing to continued supination of the manus, occupies a position at the external side of the coronoid process of the ulna, and impinges on the outer part of the condyle of the humerus. The concavity of its head and the convexity of the humeral condyle are visible as before, but a prominent tongue or keel, which has been called the intertrochlear crest, separates the ulnar and radial surfaces of the humerus. (Fig. B). This keel occupies the groove or interval which separates the head of the radius from the coronoid process of the ulna. It is plain that we have here another tongue and groove joint, produced by the mutual adaptation of parts, under strain, pressure and impact. The other extreme of elbow joint is found in

that of the diplarthrous Ungulata (Fig. E). Here the head of the radius, while retaining its normal position on the inner side of the forearm, is extended to the external side of the ulna and even beyond it, adapting itself to the entire width of the humeral condyles. The same structure is found in the specialized forms of both series of Diplarthra, the Perissodactyla and Artiodactyla. This expansion of the head of the radius appears to be in direct relation to the duration through long geologic ages of the impacts which have affected the limbs of these, the swiftest of the Mammalia. That the head of the radius should be spread so as to fit the entire surface of the humerus as an effect of continued impact, seems to be a mechanical necessity. But in addition to this we find a tongue-and-groove adaptation in which the crest (which I have called the trochlear crest), articulates with a groove in the head of the radius. The internal articulation of the humerus with the radius has the usual form, convex and concave distad. The trochlear crest marks the external border of the olecranar groove of the humerus. But the external part of the humeral condyles is converted into a roller which is set off from the trochlear crest, by the abrupt contraction of its diameter; while the corresponding part of the head of the radius projects to fit it exactly.

A probable explanation of the form of this roller may be derived from a consideration of the almost identical structure of the metapodio-phalangeal articulation in the Artiodactyla. The internal and external sides of the distal metapodial condyles are not similar; a character very distinct in the Artiodactyla (Fig. E). This is simply due to the unequal pressure exerted on the two extremities of the condyle by the phalanges, owing to the divergent direction of the digits when serving as a support. In the distal end of the humerus, the same effect is seen, the external part of the condyle nearly resembling the corresponding part of the metapodial bones. This is traceable to the same cause, viz., the divergent position assumed by the forearm on the humerus, when the weight is supported on one fore leg only. This brings the line of pressure through the external part of both the head of the radius and the humeral condyle (Fig. 42).

Although I have already given what is essentially the same explanation of this structure (*op. cit.*, p. 199), the above renders clearer some points

III. Atrophy of the Ulna and Fibula.

Successive atrophy of the ulna and fibula is coextensive with reduction of the number of the digits in the ungulate Mammalia, and with the development of the digital patagium in the bats. This is in broad contrast to the subequal development of the ulna and radius in the Cetacea, where the fore limb functions as the blade of an oar. The cause of the reduction of the two elements in the Ungulata is the restriction of the functions of the fore and hind limbs to the radius and tibia respectively. The distal extremities of the ulna and fibula in primitive Ungulata were sup-

ported by the external bones of the carpal and tarsal series respectively. The reduction of the external digit deprives the external bones in question of their share in the support of the general weight, and consequently relieves them of impact, which now passes through the longer median digits which remain. The median digits, on the other hand, support the radius and tibia through the medium of the carpus and tarsus, and it is these elements, therefore, which function in the use of the limb. We have here an evident illustration of the effect of disuse in effecting the atrophy of an element, and of use in increasing the size and complexity of an adjacent element of the same organism. No other explanation seems possible, for the elements which are reduced and those which are enlarged are subjected in every other respect to the same conditions.

On False Elbow Joints.

By Prof. E. D. Cope, Ph.D.

(*Read before the American Philosophical Society, December 2, 1892.*)

I have in various papers formulated and defended the hypothesis that the peculiar characters of the articulations of the mammalian skeleton are due to mechanical causes operating throughout the ages of geologic time.* I had previously traced the succession of these modifications from simple reptilian types, through various stages, to the highly specialized and mechanically perfect structures seen in the higher Mammalia. The series of forms revealed by paleontologic research is so complete as to leave little doubt in the mind as to the manner and cause of their origin. The theory thus derived, which I have called kinetogenesis, depends for its demonstration on two assumptions. The first is that living osseous tissue is plastic, and is therefore readily modified in its form by impacts, strains, friction, etc.; and the other is that one which is necessary to all evolutionary hypotheses, that acquired characters are inherited. I do not propose to discuss here the latter proposition, but I desire to offer some evidence in support of the former. Marey tells us,† as a result of a study of pathological conditions of articulations, that "after dislocations the old articular cavities will be filled up and disappear, while at the new point where the head of the bone is actually placed, a fresh articulation is formed, to which nothing will be wanting in the course of a few months; neither articular cartilages, synovial fluid, nor the ligaments which retain the bone in place."

Specimens demonstrating the truth of this statement of Marey are also

* *Origin of the Fittest*, 1887, p. 368 *et seq.*; "The Mechanical Origin of the Hard Parts of the Mammalia," *American Journal of Morphology*, 1889, p. 148.

† *Animal Mechanism*, 1874, pp. 88, 89.

demonstrative of the truth of the doctrine of kinetogenesis. Two such have recently come under my observation—both of them cases of dislocation of the elbow joint. One of these is that of a man (No. 1838, Wistar and Hornor Museum of the University of Pennsylvania), where the cubitus is luxated backwards. The other is that of a horse, where the cubitus is luxated outwards, which I owe to the kindness of Dr. William B. Werntz, Vet., of Philadelphia. These specimens are especially instructive as exhibiting the different effects of different luxations of the same articulation.

Elbow of Man.

The human elbow, for which I am indebted to the authorities of the University of Pennsylvania, is so dislocated as to have allowed little flexion and extension during life, but the radius retained rotary motion. The humeral condyle rests on the ulna anterior to the coronoid process, and the head of the radius is in contact with the posterior side of the external epicondyle. It has resulted in consequence of the abnormal position of the humerus, that a new coronoid process has developed as far anterior to the true coronoid as the latter is anterior to the olecranon; and that a new humeral cotylus has appeared between the two coronoids whose fundus is considerably elevated above that of the old one. In consequence of the contact of the head of the radius, a deep cotylus has been formed on the posterior face of the external epicondyle and adjacent part of the condyle of the humerus, which is well adapted to the radial head. From both of these new cotyli I removed a layer of articular cartilage, and the osseous surface is as smooth and dense as those of normal articulations. The edges of the cotyli are not as smooth as those of the normal, but display the greater or lesser irregularities of unfinished osseous deposit, except the internal border of the radial cotylus of the humerus which is perfectly regular.

Remarkable exostoses accompany the development of the cotyli. The normal humeral cotylus of the ulna is partially filled with rough osseous deposit. The internal epicondyle of the humerus sends a process downwards and posteriorly towards this cotylus, which it does not reach, but projects freely. The external epicondylar region develops three processes of which the posterior and inferior anterior (distal) embrace the head of the radius, forming the posterior and anterior boundaries of the radial cotylus. Two ridges of exostosis of the shaft terminate at the posterior process. The superior anterior process is short, and projects freely distad. But a small portion of the condyle proper retains its articular surface; that is the posterior part of the internal condyle which articulates with the ulna. The remaining surface of the condyles is concealed by irregular bone deposits which quite obliterate its normal form, especially on the posterior (olecranar) surface, where the deposit is thickest and most irregular.

Elbow of a Horse.

I am informed by Dr. Werntz that the horse with dislocated elbow lived for about two years after the accident, in the country, dying of pneumonia. It used the leg (the left one) to a moderate degree, walking on the extremity of the hoof, with the elbow everted.

It results from the dislocation, that the internal part of the head of the radius was in life without opposing humeral surface. The trochlear crest of the humerus rotated inside of the median ridge of the head of the radius; and the interior roller of the humerus projected freely within the internal border of the head of the radius. The external border of the humeral condyles corresponds to the trochlear groove of the head of the radius, which, of course, it does not fill. Since the internal face of the olecranar process rotates on the external epicondyle of the humerus, it follows that the external face of the olecranar process has no contact and was unused.

The mechanical result of this position of the parts is as follows: The internal side of the olecranar process develops friction on the external surface of the external epicondyle of the humerus. The trochlear crest of the humerus produces the same along the inner side of the median crest of the head of the radius. The expansion of diameter of the internal roller of the humerus produces friction on the internal edge of the head of the radius.

The structural result may be divided into two divisions: *first*, those developed at points of contact of the parts thus abnormally brought together, and *second*, those which appear at points abnormally separated.

Class First. (1) A large new facet is developed on the posterosuperior aspect of the external epicondyle of the humerus (*1a*, Figs. 1 and 3), which lies in an arc continuous with that of the external roller (or condyle), and whose surface is directed downwards and outwards. It occupies the usual position of the external *flexor metacarpi* muscular insertion, which is in the normal humerus a truncate oval, looking downwards and backwards. This surface has been almost entirely removed, the posterior face of the lateral rib of the humerus terminating below in an obtuse acumination, instead of the form described. The form of the new facet is not entirely due to the planing down or absorption of this region. The external epicondylar fossa is filled with exostoses, of which a large one in a superior position contributes material for the inferior part of the new facet. The posterior rib of the humerus is also exostosed so as to present a rough surface of greater transverse extent than in the normal humerus. This mass overhangs the new olecranar facet, forming a guide to its free extremity in rotation, the latter thus running in an open groove. Thus is further luxation in a measure provided against.

(2) The internal half of the humeral facet of the olecranar process is narrowed, and its prominent internal rim rounded off; and it is con-

tinued to the radial articular surface, instead of being separated by an interruption as seen in the normal horse. In extension and flexion the prominent posterior border of the new olecranar facet of the humerus rotates behind the humeral olecranar facet just described. Posterior to this depressed surface there rises an abnormal bony crest which is concentric with the olecranar and humeral surfaces, and serves as a guide in extension and flexion of the crest of the humerus which moves in the surface in front of it, which becomes, through the presence of this crest, an open groove (*1e*, Figs. 4, 5).

(3) A triangular shallow facet is formed on the posterior part of the head of the radius corresponding to the trochlear crest of the humerus (*1f*, Figs. 2, 4).

(4) A corresponding facet appears on the posterior part of the trochlear crest of the humerus, which penetrates the dense layer (*1e*, Fig. 1).

(5) The internal extremity of the humeral surface of the head of the radius is beveled off by the expansion of the internal roller of the humerus, forming a new facet of perfect articular character (*1b*, Figs. 1, 2, 4).

(6) A facet corresponding to (5) is developed on the internal roller at its middle, considered either transversely or anteroposteriorly. It is of an elongate oval form, and its superior portion penetrates the dense layer (*1d*, Fig. 1).

Class Second. (1) The trochlear groove of the head of the radius has nearly closed its anterior and posterior margins by osseous outgrowths, the largest of which, the posterior, so fills it as to support the external part of the external humeral condyle in extension and flexion (*2a*, *2b*, Figs. 2, 4, 6).

(2) Exostoses exist on the external side of the humeral facets of the olecranar process, which fill part of the concave arc of the ulna, necessary for adaptation to the external border of the humerus in its new position (*2c*, Figs. 4, 6).

(3) At the internal and posterior sides of the head of the radius a mass of exostoses causes a considerable thickening of the bone. Its thickness on the internal side is just equal to the free projection of the internal roller of the humerus within the head of the radius. It is not, however, built up to the plane of the head of the radius, and so does not yet support the humerus.

Summary.—As a result of the abnormal action of this luxated elbow we have the following production of new structures. Four complete new facets, viz.: One on the humerus, one on the ulna, one on ulna and radius, and one on the radius. Two incomplete new facets on the humerus. The development of two new crests, which serve as guides to rotating margins. Second, the partial filling by exostosis of two unused facets, one on the ulna, and one on the radius; third, the filling by exostosis of an epicondylar fossa which serves to build out a new facet; and, fourth, the building out by exostosis of the head of the radius, which if

continued would have extended the head of the radius for adaptation to the inwardly luxated humerus.

ETIOLOGY.—That the new structures described are due to the abnormal mechanical relations of the bones, will be questioned by no one. We observe three distinct processes of osseous metabolism due to these conditions. These are: *First*, the removal of tissue from its original locality, and the substitution of dense tissue for spongy tissue at the point of removal. This has been accomplished at three points. A. Where the inferior extremity of the external posterior rib of the shaft of the humerus has been largely cut away, in adaptation to the movement of the olecranar crest of the ulna, and a dense layer developed over the new surface thus produced. B. Where the internal border of the head of the radius has been beveled off. C. Where the internal face of the humeral facet of the olecranar process of the ulna has been planed down without exposing the spongy bone. That this process was not completed at some points is shown by the two new facets of the humeral condyles, where the dense layer is penetrated and no corresponding dense layer established on the spongy layer thus exposed (Figs. *1d* and *1e*).

Second. The deposit of osseous bodies beneath the synovial walls where the bursa was kept expanded by the failure of the articular ends of the bones to maintain contact, as in the case of the trochlear groove of the head of the radius, and the external side of the humeral facet of the olecranar process of the ulna.

Third. The development of exostoses at the insertions of articular ligaments and tendons at the following three points: A. At the insertion of the *flexor metacarpi externus* ligament, at the exterior border of the posterior face of the inferior end of the shaft of the humerus, which crest overhangs the new facet above described. B. Where the osseous crest is developed on the ulna, concentric with the interior humeral facet of the olecranar process. C. Where extensive exostosis appears on the internal side of the head of the radius. D. Where the external epicondylar fossa is filled with exostoses (other ligamentous exostoses at *3e*, *f* and *g*, Figs. 1, 2, 4, 5).

From the above analysis we may derive the following conclusions as to the nature of the metabolism in the several cases:

Class First Continued excessive friction removes osseous tissue from the points of contact until complete adaptation is accomplished and the friction is reduced to a normal minimum.

Class Second. Where the normal friction is wanting, and an inflammatory condition is maintained by a pulling stress on the investing synovial membrane, excess of osseous deposit is produced.

Class Third. Stress on the articular ligaments and tendons stimulates osseous deposit at their insertions, which deposit may be continued into their substance. This is a pulling stress.

CONCLUSIONS.—We find illustrated in these specimens three kinds of osseous structures which are observed in normal vertebrate skeletons.

These are, articular facets, osseous deposit at presumed points of irritation from various stimuli, and the development of bone at ligamentous and tendinous insertions. To the combination of the causes which produce the first and second effects we owe most of the secondary peculiarities of the vertebrate skeleton; and to the third we owe the fundamental construction of the skeleton on which the secondary modifications have been superposed. It is not important to our contention if the histological structure of some of the abnormal osseous deposits in our specimen may differ slightly from the normal tissues sought to be explained by it. This may be accounted for by the different circumstances to which the two sets of phenomena are due. In the dislocation the change from the antecedent state of the parts is violent and abrupt. In the evolution of the vertebrate skeleton the process was slow and gradual. In the cases of the luxations nature had to meet the changed conditions by correspondingly abnormal measures. In orderly evolution "*saltus non fecit.*" It may, however, be justly inferred, that if such characteristic structures can be produced in the space of months, how much more easy has it been for stimuli of allied character to develop the features of normal articulations during the ages of geologic time.

We have here, also, an instructive lesson as to the matter of inheritance. Every one knows that mutilations, luxations, etc., are not usually inherited. This is because they are not "acquired" in the proper sense of the word. Since characters truly acquired are inherited, it is evident that a long continuance of the stimulating cause is necessary to produce a true acquisition. The difference between a character produced by causes apart from the normal life of an animal and not repeated, and those produced by causes operating daily and hourly for geologic ages, is necessarily very great. And, as Prof. Scott* remarks, the latter have not been acquired during the lifetime of each generation, since they are found in the young before birth, before external stimuli have had the opportunity to exert their influence.

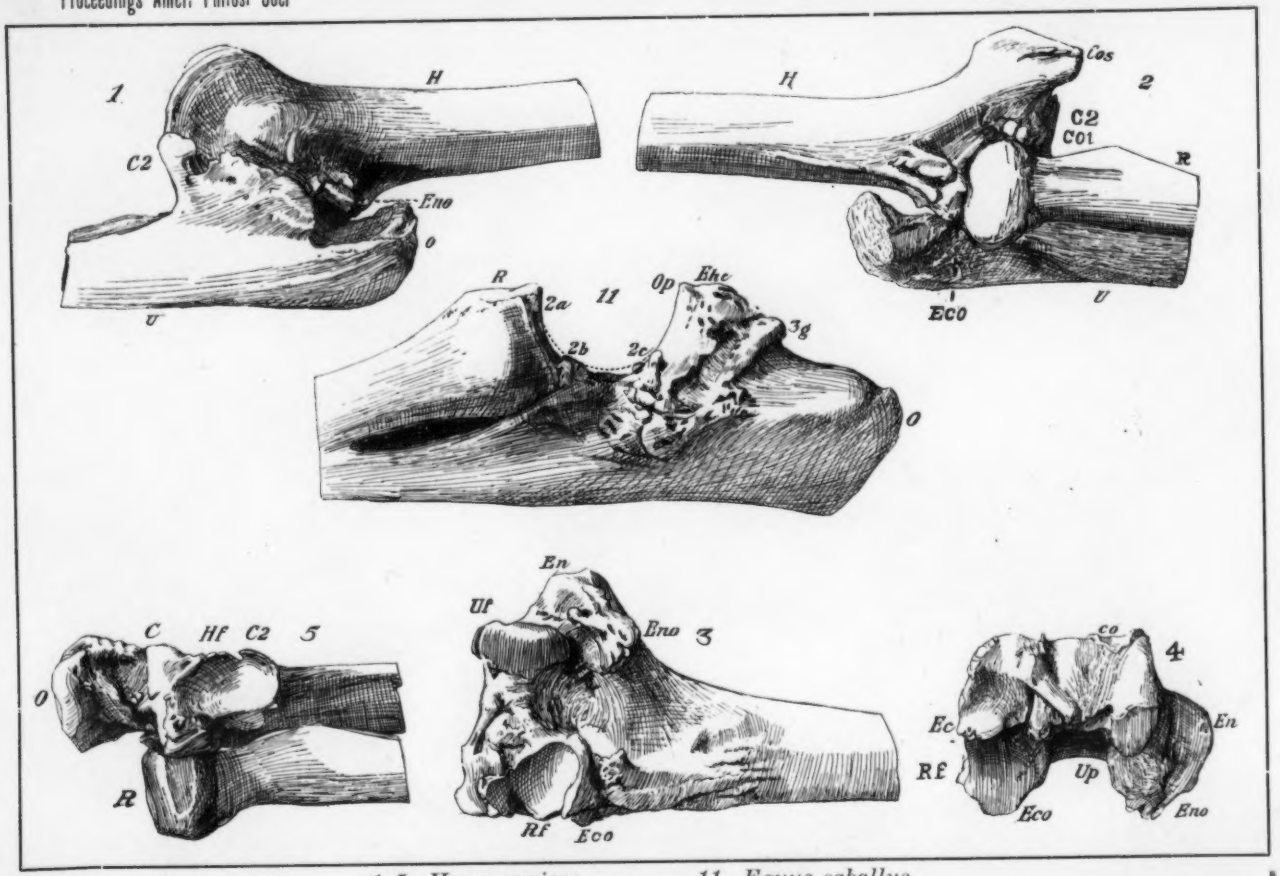
Explanation of Plates.

Figs. 1–5. *Homo sapiens*, luxated elbow joint; one half natural size.

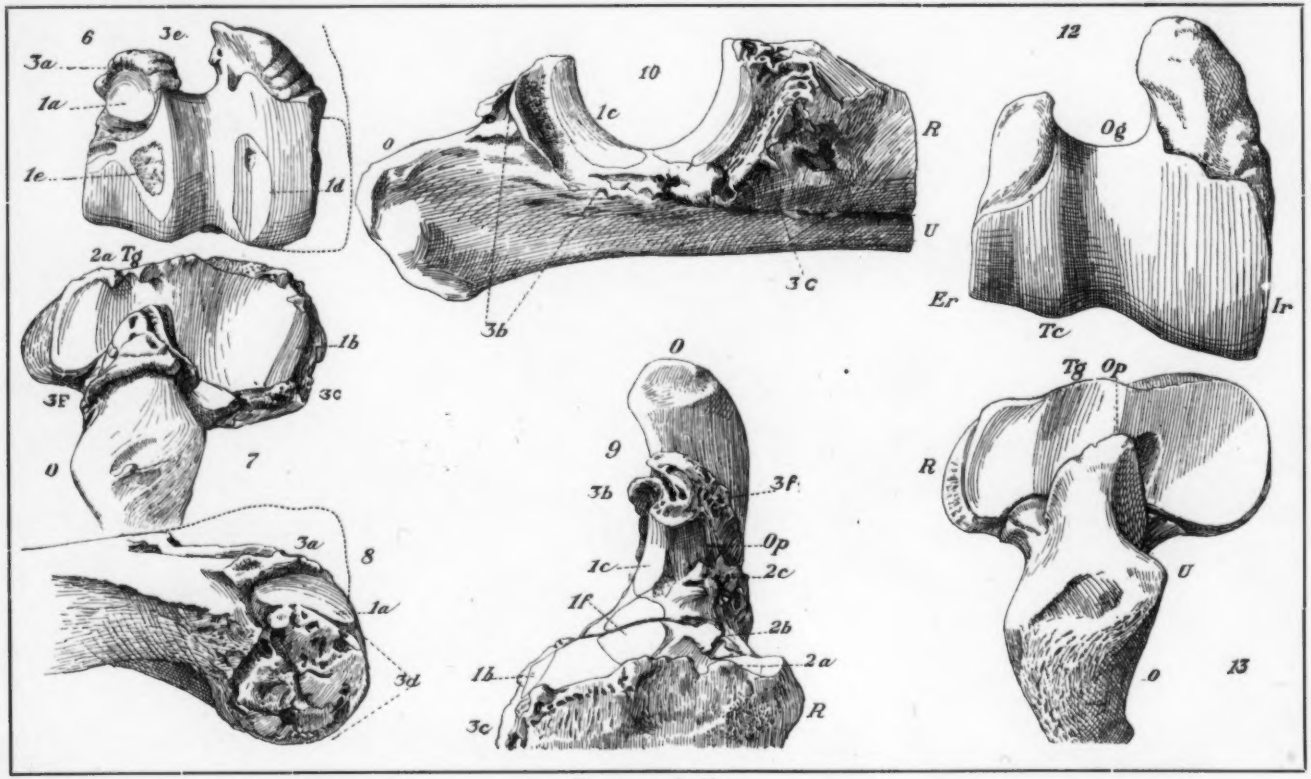
1. Luxated elbow joint, from within.
2. Luxated elbow joint, from outer side.
3. Humerus, posterior view of distal region.
4. Humerus, distal view.
5. Ulna and radius, anterior (superior) view.

Lettering.—*H*, humerus; *U*, ulna; *R*, radius; *C*, coronoid process; *C2*, second (abnormal) coronoid process; *O*, olecranon; *En*, entepicondyle; *Ec*, ectepicondyle; *Eno*, entepicondylar exostosis; *Eco*, ectepicondylar exostosis; *Co*, condylar exostosis; *Cos*, superior condylar exostosis; *Coi*,

* "On the Osteology of Mesohippus and Leptomeryx," *American Journal of Morphology*, 1891, p. 385.



1–5. Homo sapiens. *11. Equus caballus.*



Equus caballus.

inferior condylar exostosis; *Hf*, humeral facet; *Rf*, radial facet; *Uf*, ulnar facet.

Figs. 6–11. Bones of abnormal left elbow joint of horse; one-half natural size.
12, 13. Normal bones of elbow joint of horse; one-half natural size.
6–12. Humerus, distal views.
7–13. Cubitus, proximal views.
8. Humerus, external view of distal extremity.
9. Humeral articulation of cubitus, from above.
10. Cubitus, internal view.
11. Cubitus, external view.

Additional lettering.—*Op*, olecranar process of ulna; *Cp*, coronoid process of ulna; *Og*, olecranar groove of humerus; *Te*, trochlear crest of humerus; *Tg*, trochlear groove of humerus; *Ehc*, external humeral facet of coronoid process; *Ihc*, internal humeral facet of coronoid process.

The lettering of the abnormal facets and exostoses in Figs. 6–11 conforms to that of the same in the etiological classification on page 289.

Stated Meeting, September 2, 1892.

Present, 3 members.

President, Mr. FRALEY, in the Chair.

The decease of the following members was announced:

M. F. Longstreth, Sharon Hill, Pa., December 27, 1891, æt. 73.

H. Burmeister, Buenos Ayres, May 6, 1892, æt. 86.

John R. Baker, Philadelphia, June 22, 1892, æt. 74.

George William Curtis, New York City, August 31, 1892, æt. 68.

Correspondence was submitted as follows:

A letter accepting membership from Mr. Joseph D. Potts, Philadelphia, dated May 24, 1892.

A letter acknowledging receipt of diploma from Dr. Caspar René Gregory, Leipzig.

A circular from the R. Accademia delle Scienze di Torino,

announcing the death of its Vice-President, Prof. Comm. Giovanni Flechia, June 3, 1892.

A circular from the Committee for the Erection of a Monument to the Memory of M. A. de Quatrefages, inviting subscriptions for that purpose.

A circular from the Royal Society of N. S. Wales, offering its medal and £25 for the best communication containing the results of original research or observation upon the various subjects named.

An invitation from the Buffalo Historical Society to the unveiling of the statue of Red Jacket, erected by that Society, to take place June 22, 1892.

An invitation from the Deutsche Anthropologische Gesellschaft, to attend the Twenty-third Congress, to take place at Ulm, August 1 to 3, 1892.

A circular from the American Chemical Society, New York, announcing the Fifth General Meeting, to be held at Rochester, N. Y., August 16 and 17, 1892.

A program of meetings and excursions of the Sixth Session of the Congrès Géologique International, to take place at Zurich, in 1894.

Announcement of the Tenth Session of the Congrès Internationale des Orientalistes, to be held at Lisbon, September 23 to October 1, 1892.

A letter from Mr. Lorin Blodgett, dated Philadelphia, July 16, 1892, enclosing memorandum of a project devised by his ancestor, Samuel Blodgett, for the formation of a National University, to be erected in Washington, D. C.

A letter from C. H. Hart, Esq., giving reasons to show that the portrait labeled Francis Hopkinson was really that of Samuel Vaughan. The communication was referred to the Curators.

Letters of envoy were received from the Australasian Association for the Advancement of Science, Sydney; Naturforsche Gesellschaft, Dorpat, Russia; Comite Geologique, Observatoire Physique Central, St. Petersburg; Institut Météorologique de Roumaine, Bucarest; Société R. Norvégienne des

Sciences, Throndhjem; Université Royale, Lund, Sweden, Musée Teyler, Harlem, Holland; Maatschappij der Nederlandsche Letterkunde, Leiden, Holland; Naturforschende Verein, Brünn, Austria; K. Akademie der Wissenschaften, Berlin; K. Sächsische Gesellschaft der Wissenschaften, Leipzig; Gesellschaft zur Beförderung der gesammten Naturwissenschaften, Marburg; Centralbureau der Internationalen Erdmessung, Potsdam, Prussia; Altertumsverein für Zwickau und umgegend, Zwickau, Saxony; École Polytechnique, Bureau des Longitudes, Musée Guimet, Paris; Meteorological Office, Royal Statistical Society, London, Eng.; Royal Irish Academy, Dublin; Geological Survey of Pennsylvania, Harrisburg; U. S. Fish Commission, Washington, D. C.; University of Wisconsin, Madison.

Letters of acknowledgment (Transactions xvii, 1 and 2) were received from the Observatoire Physique Central de Russie, St. Petersburg; Geological and Natural History Survey, Ottawa, Canada; Museum of Comparative Zoölogy, Cambridge, Mass.; American Antiquarian Society, Worcester, Mass.; Yale University, New Haven, Conn.; State Library, Albany, N. Y.; Buffalo Library, N. Y. Historical Society, New York; New Jersey Historical Society, Newark; Academy of Natural Sciences, Franklin Institute, Library Company, Philadelphia; U. S. Geological Survey, Washington, D. C.; University of California, Berkeley; California Academy of Sciences, San Francisco; State Historical Society of Wisconsin, Madison.

Letters of acknowledgment were received from the Institut Egyptien, Cairo (135); R. Society of N. S. Wales, Sydney (135); I. Academy of Sciences (136, 137), Russian Chemical Society, St. Petersburg (136); Observatory, Taschkent (136); Université Royale, Lund, Sweden (132–136); Société Hongroise de Geographie, Budapest (136); K. K. Central Anstalt für Meteorologie, etc. (137), K. K. Naturhistorisches Hofmuseum (136), Prof. Franz v. Hauer (134–137), Dr. Frederick S. Krauss (134–136), Drs. M. Much, Frederick Müller (136), E. Suess (135, 136), Vienna, Austria; Naturforschende Gesell-

schaft des Osterlandes, Altenburg (137); University, Bonn (136); Prof. H. von Helmholtz, Charlottenburg (132, 133, 135, 136, 137); K. Sächsisches Meteorologisches Institut, Chemnitz (96–130, 136, 137, and Catalogue Parts i–iv); Verein f. Erdkunde, Dresden (137); Naturforschende Gesellschaft, Emden (136, 137); Oberhess. Gesellschaft für Natur- und Heilkunde, Giessen (136); Naturhistorische Gesellschaft, Hanover (136); Verein der Freunde der Naturgeschichte, Mecklenburg (131–136); K. Sternwarte (136), Prof. J. Victor Carus (136), Dr. Julius Platzmann (137), Leipzig; Naturwissenschaftlicher Verein, Osnabrück (96–136, and Catalogue Parts i–iv); Prof. Dr. Johannes Dümichen, Strassburg (135); Royal Zoölogical Society, Natura Artis Magistra, Amsterdam (136); Royal Zoölogical and Botanical Society, The Hague (136); Tyler Museum, Harlem, Holland (136); Société Royale de Geographie, Antwerp, Belgium (134); R. Accademia dei Lincei, R. Comitato Geologico D'Italia, Prof. Guiseppe Sergi, Rome (136); Académie R. des Sciences, Prof. Guido Cora, Turin (136); Société D'Emulation, Abbeville (136); Société de Borda, Dax (136); Société des Sciences Naturelles and Archieologiques de la Creuse, Guéret (136); "Le Cosmos" (137), Musée d'Histoire Naturelle (134), Marquis de Nadaillac, Profs. Abel Hovelacque, Léon de Rosny (137), Paris; Mr. Samuel Timmins, Arley, near Coventry, Eng. (137); Philosophical Society, University Library, Cambridge, Eng. (137); Mr. Alfred R. Wallace, Parkston, Dorset, Eng. (137); British Museum of Natural History (128, 131, 132, 133, 137), Royal Society, Local Government Board, Royal Meteorological Society, Department of Science and Art, Royal Geographical Society, Royal Institution, Royal Astronomical Society, Linnean Society (137), Sir James Paget (137), Dr. W. H. Flower (128, 131, 132, 133, 137), Messrs. C. Juhlin Dannefeld, Charles G. Leland, Rawson W. Rawson (137), London, Eng.; Geographical Society, Manchester (137); Natural History Society, Newcastle-on-Tyne (137); Radcliffe Observatory, Prof. J. J. Sylvester, Oxford, Eng. (137); Royal Geological Society of Cornwall, Penzance, Eng. (137); Royal Society, Royal Obser-

vatory, Edinburgh (137); Philosophical Society, Glasgow (137); Prof. James E. Oliver, Ithaca, N. Y. (130, 137); Columbia College, Editors of "Popular Science Monthly," N. Y. Mathematical Society, Mr. James Douglas, New York (137); Geological Society of America, Rochester, N. Y. (137); N. J. Natural History Society, Trenton (137); Dr. Persifor Frazer, Mr. Joseph D. Potts, Philadelphia (137); Rev. F. A. Muhlenberg, Reading, Pa. (136, 137); Maryland Historical Society, Baltimore (137); Smithsonian Institution, Washington, D. C. (540 packages, 137); Michigan Agricultural College, Ingham Co. (135, 136, 137); Kansas State Historical Society, Topeka (128); Sociedad Cientifica "Antonio Alzate" (127, 132, 133), Observatorio Astronomico N. M., Tacubaya (137); Agricultural College of New Mexico, Las Cruces (137); Bishop Crescencio Carrillo, Merida, Yucatan (137); Museo Nacional, Buenos Ayres, S. A. (135).

Letters of acknowledgment (138) were received from Mr. Horatio Hale, Clinton, Ontario; Hon. J. M. Le Moine, Quebec; McGill College, Natural History Society, Montreal; Geological Survey, Ottawa; Canadian Institute, Toronto; Historical and Scientific Society, Winnipeg; Bowdoin College, Brunswick, Me.; Society of Natural History, Portland, Me.; Prof. Charles E. Hitchcock, Hanover, N. H.; Vermont Historical Society, Montpelier; Hatch Experiment Station, Amherst, Mass.; Mr. Robert N. Toppan, Museum of Comparative Zoölogy, Cambridge, Mass; Massachusetts Institute of Technology, State Library of Massachusetts, Boston Society of Natural History, Massachusetts Historical Society, Messrs. Hamilton A. Hill, Robert C. Winthrop, Boston; Essex Institute, Salem, Mass.; Rhode Island Historical Society, Providence Franklin Society, Providence, R. I.; Mr. George F. Dunning, Farmington, Conn.; Connecticut Historical Society, Hartford; New Haven Colony Historical Society; Prof. James Hall, Albany, N. Y.; Buffalo Library, N. Y.; Prof. E. North, Clinton, N. Y.; Profs. J. M. Hart, J. E. Oliver, B. G. Wilder, Ithaca, N. Y.; New York Hospital, Historical Society, Academy of Medicine, Columbia College, Entomological

Society, Mathematical Society, Astor Library, American Museum Natural History, University of the City of New York, "Popular Science Monthly," Prof. J. A. Allen, Messrs. James Douglass, R. W. Raymond, New York; Vassar Brothers' Institute, Poughkeepsie, N. Y.; Geological Society of America, Rochester, N. Y.; U. S. Military Academy, West Point, N.Y.; Prof. Henry M. Baird, Yonkers, N. Y.; Mr. Isaac C. Martindale, Camden, N. J.; Free Public Library, Jersey City, N. J.; New Jersey Historical Society, Newark; Prof. C. A. Young, Princeton, N. J.; Oneida Historical Society, Utica, N. Y.; Dr. Robert H. Alison, Ardmore, Pa.; Prof. Charles F. Himes, Carlisle, Pa.; Hon. Eckley B. Coxe, Drifton, Pa.; Prof. M. H. Boyé, Coopersburg, Pa.; Profs. Trail Green, Thomas C. Porter, J. W. Moore, Easton, Pa.; Mr. Andrew S. McCreath, Harrisburg, Pa.; Prof. Lyman B. Hall, Haverford, Pa.; Mr. John Fulton, Johnstown, Pa.; Linnean Society, Lancaster, Pa.; Prof. John F. Carll, Pleasantville, N. J.; Rev. F. A. Mühlenberg, Reading, Pa.; Rev. G. W. Anderson, Rosemont, Pa.; Dr. John Curwen, Warren, Pa.; Mr. Philip P. Sharples, Hon. Washington Townsend, Philosophical Society, West Chester, Pa.; College of Physicians, Academy of Fine Arts, Historical Society of Pennsylvania, Library Company of Philadelphia, Numismatic and Antiquarian Society, Engineers' Club, Wagner Free Institute of Science, Messrs. Charles Bullock, Henry C. Baird, S. Castner, Jr., Thomas M. Cleemann, Patterson Du Bois, Edward Hopper, Joseph S. Harris, James T. Mitchell, Robert Patterson, Franklin Platt, J. D. Potts, J. G. Rosengarten, Theodore D. Rand, Coleman Sellers, L. A. Scott, D. K. Tuttle, Louis Vossion, Charles Stewart Wurts, Ellis Yarnall, Mrs. Helen Abbott Michael, Profs. John Ashhurst, Jr., H. D. Gregory, F. A. Genth, Jr., L. M. Haupt, H. W. Spangler, Drs. W. G. A. Bonwill, D. G. Brinton, George Friebis, Persifor Frazer, William Goodell, George R. Moorehouse, John Marshall, Charles A. Oliver, C. N. Peirce, W. S. W. Ruschenberger, Benjamin Sharp, H. Clay Trumbull, William H. Wahl, Philadelphia, Pa.; Mr. William M. Canby, Wilmington, Del.; Maryland Institute, Baltimore;

Smithsonian Institution, U. S. Geological Survey, U. S. Coast and Geodetic Survey, Anthropological Society, Surgeon General's Office, Patent Office, Weather Bureau, Mr. W. B. Taylor, Dr. W. J. Hoffman, Profs. S. F. Emmons, C. V. Riley, Charles A. Schott, Washington, D. C.; University of Virginia, Prof. J. W. Mallet, Charlottsville, Va.; Mr. Jed. Hotchkiss, Staunton, Va.; Agricultural Experiment Station, Prof. I. C. White, Morgantown, W. Va.; Georgia Experiment Station, Experiment; Georgia Historical Society, Savannah; University of Alabama, Tuscaloosa; Agricultural Experiment Station, Baton Rouge, La.; Prof. J. C. Branner, Palo Alto, Cal.; University of California, Berkeley; Lick Observatory, Mt. Hamilton, Cal.; Prof. Daniel Kirkwood, Riverside, Cal.; Prof. E. W. Claypole, Akron, O.; Ohio Archæological and Historical Society, Columbus; Cincinnati Observatory, O.; Davenport Academy of Natural Sciences, Iowa; State University, Iowa City, Iowa; Prof. J. L. Campbell, Crawfordville, Ind.; Purdue Experiment Station, La Fayette, Ind.; University of Michigan, Ann Arbor; Michigan Agricultural College, Ingham Co.; Geological Survey of Missouri, Jefferson City; Prof. Herman Haupt, St. Paul, Minn.; State Historical Society of Wisconsin, Madison; Kansas State Historical Society, Topeka; Agricultural Experiment Station, Manhattan, Kans.; Agricultural College of New Mexico, Las Cruces; Observatorio Astronómico Nacional Mexicano, Tacubaya; Don Mariano Barcena, Dr. Antonio Péñafiel, Sociedad Cientifica "Antonio Alzate," Mexico.

Donation to Cabinet—Phototype of Dr. Benjamin Franklin, from Mr. Julius R. Sachse, Philadelphia, Pa.

Accessions to the Library were reported from the R. Geographical Society of Australasia (Queensland Branch), Brisbane; R. Geographical Society of South Australasia, Melbourne; Royal Society of New South Wales, Australasian Association for Advancement of Science, Sydney; Royal Society of Tasmania, Hobart; Tokyo Library, Geographical Society; Royal Asiatic Society (Straits Branch), Singapore; K. Akademie der Wissenschaften, Comité Geologique, St.

Petersburg; Société Finno-Ougrienne, Helsingfors; Société des Naturalistes, Kief; Société des Naturalistes, Odessa; Institut Météorologique de Roumaine, Bucarest; Naturforsche Gesellschaft, Dorpat; University, Lund, Sweden; K. Norske Videnskabers Selskab, Throndhjem; Naturforschender Verein, Brünn, Austria; K. K. Sternwarte, K. Böhmische Gesellschaft der Wissenschaften, Prag; K. Akademie der Wissenschaften, Geologische Reichsanstalt, K. K. Naturhistorische Hof-Museum, Vienna; Physiologische Gesellschaft, K. P. Geologische Landesanstalt und Bergakademie, Berlin; Naturwissenschaftlicher Verein, Bremen; Naturwissenschaftliche Gesellschaft (Isis), Dresden; Oberhessische Gesellschaft, Giessen; Naturhistorische Gesellschaft, Hanover; K. Gesellschaft der Wissenschaften, Göttingen; Gesellschaft zur Beförderung der Gesammten Naturwissenschaften, Marburg; Centralbureau der Internationalen Erdmessung, Potsdam; Altertumsverein für Zwickau und umgegend, Zwickau; Nederlandsche Maatschappij ter Bevorderung van Nijverheid, Musée Teyler, Hollandaise Maatschappij der Wetenschappen, Harlem; Friesch Genootschap van Geschied-Oudheiden Taalkunde, Leeuwarden; Maatschappij der Nederlandsche Letterkunde, Leiden; K. Bibliothek, 's Gravenhage; Société R. Malacologique de Belgique, Bruxelles; Musée d'Histoire Naturelle, Lausanne; Prof. E. Renevier, Lausanne; R. Accademia di Scienze Morale e Politiche, Naples; Ministiro di Agricoltura, Industria e Commercia, R. Comitato Geologico d'Italia, R. Accademia dei Lincei, Prof. Giuseppe Sergi, Rome; M. L. Michael-Angelo Billia, "Il Nuovo Resorgimento," Milan; R. Accademia di Scienze Morale e Politiche, Naples; Société Linnéenne, Bordeaux; Académie N. des Sciences, Arts, etc., Caen; Société N. des Sciences, Arts, etc., Cherbourg; Académie des Sciences, Arts, etc., Dijon; Union Géographique du Nord de la France, Donai; Société de Geographie, Lille; École Polytechnique, Zoölogical and Anthropological Societies, Musée Guimet, Bureau des Longitudes, Muséum d'Histoire Naturelle, "La Revue des Revues," Paris; R. Cornwall Polytechnic Society, Royal Observatory, Greenwich; Philosophi-

cal and Literary Society, Leeds; Royal Society, Linnean Society, Meteorological Council, London; Literary and Philosophical Society, Manchester; Natural History Society of Northumberland, Durham, etc., Newcastle-on-Tyne; Royal Irish Academy, Dublin; Geological and Natural History Survey of Canada, Ottawa; Canadian Institute, Toronto; Novascotian Institute of Science, Halifax; Society of Natural Sciences, Portland; Agricultural Experiment Station, Amherst, Mass.; Massachusetts Historical Society, Mr. Robert T. Swan, Boston; Messrs. Hilborne T. Cresson, Andrew McFarland Davis, Cambridge, Mass.; Free Public Library, New Bedford, Mass.; Rhode Island State Agricultural Experiment Station, Providence; Connecticut Historical Society, Hartford; Yale University, American Oriental Society, New Haven, Conn.; Brooklyn Library; Prof. James Hall, Albany, N. Y.; Agricultural Experiment Station, Geneva, N. Y.; American Institute of Electrical Engineers, Academy of Sciences, Council of the Scientific Alliance of New York, American Museum Natural History, Meteorological Observatory, New York; New Jersey Agricultural Experiment Station, Geological Survey of New Jersey, Trenton; Pennsylvania Geological Survey, Harrisburg; State College, Pennsylvania; Zoölogical Society, Messrs. R. Meade Bache, Amos P. Brown, A. F. Chamberlain, John Ellis, Moses Klein, Henry Phillips, Jr., Philadelphia; Agricultural Experiment Station, College Park, Md.; Peabody Institute, Baltimore, Md.; Smithsonian Institution, Philosophical Society, Geological Survey, U. S. Naval Observatory, War Department, U. S. Board of Geographical Names, Bureau of Education, Director of the Mint, U. S. Fish Commission, Washington, D. C.; Col. C. C. Jones, Jr., Augusta, Ga.; Historical Society, Savannah, Ga.; Tulane University, New Orleans, La.; Archæological and Historical Society, Columbus, O.; Cincinnati Observatory; University of Chicago; University of Michigan, Ann Arbor; Public Library, St. Louis, Mo.; Geological Survey of Missouri, Jefferson City; Wisconsin Academy of Sciences, Agricultural Experiment Station, Madison; State University of Iowa, Iowa

City; Editor of "Kansas University Quarterly," Lawrence; Washburn College, Agricultural Experiment Station, Topeka, Kans.; Agricultural Experiment Station, Fargo, N. Dak.; Museo Michoacano, Morelia, Mexico; Bishop Crescencio Carrillo, Merida, Yucatan; Institut Egyptien, Cairo.

A paper by Prof. Daniel Kirkwood, entitled "On the Mutual Relations Between the Orbits of Certain Asteroids," was presented by the Secretary.

Pending nomination No. 1242 was read.

Deferred business was laid over.

And the Society was adjourned by the President.

Stated Meeting, September 16, 1892.

Present, 5 members.

President, Mr. FRALEY, in the Chair.

Correspondence was submitted as follows:

A letter from Mr. Harold Goodwin, Philadelphia, accepting membership.

New exchanges—Naturforscher Gesellschaft, Dorpat, Russia; Directeur de "La Revue des Revues," Paris; Agricultural Experiment Stations, Fargo, N. Dak., Brookings, S. Dak.

Letters of envoy were received from the Magyar Tudományos Akadémia, Budapest; Académie des Sciences, Cracow; K. Geologische Landesanstalt und Bergakademie, Berlin; Vogtländische Alterthumsforschende Verein, Hohenleuben; Ministère des Travaux Publics, Paris.

Letters of acknowledgment were received from the South African Philosophical Society, Cape Town (134, 135); Capt. Richard C. Temple, Bombay, India (136); Société de Geographie de Finlande, Helsingfors (96–130, 136, 137, and Catalogue, Parts i–iv); Observatoire Physique Central, St. Petersburg (137); Prof. Japetus Steenstrup, Copenhagen (136, 137);

Naturforschende Verein, Brünn, Austria (134, 135); Dr. Francis Pulzsky, Budapest (135); Naturhistorische Landes-Museum von Kärnten, Klagenfurt (136); Astronomische und Meteorologische Observatorium, Triest, Austria (125–130, 136); Section für Naturkunde des Ö. T. C. bei K. K. Naturhistorische Hofmuseum (136), Anthropologische Gesellschaft (136), Dr. Edward Suess (137, 138), Dr. Friedrich S. Krauss (Diploma), Vienna; Gesellschaft für Erdkunde, K. Geologische Landesanstalt und Bergakademie, Prof. F. Reuleaux, Berlin (137); Naturhistorischer Verein, Bonn (136); Schlesische Gesellschaft für Vaterländische Cultur, Breslau (136); Verein für Erdkunde, Dresden (138); Deutsche Seewarte, Hamburg (137); Naturhistorische Gesellschaft, Hanover (137); Vogtländische Alterthumsforschende Verein, Hohenleuben (137); Gesellschaft zur Beförderung der Gesammten Naturwissenschaften, Marburg (134); Verein für Erdkunde, Metz (137); K. P. Geodätische Institut, Potsdam (137); Verein für Vaterländische Naturkunde in Würtemberg, Stuttgart (135); Schweiz. Naturforschende Gesellschaft, Bern (137, 138); Prof. Carl Vogt, Geneva (137, 138); Société Vaudoise des Sciences Naturelles, Lausanne (137, 138); R. Accademia de Scienze, Lettere, etc., Padova (136); Marquis Antonio de Gregorio, Palermo (136); R. Osservatorio, Torino (136); Ministère des Travaux Publics, M. Victor Duruy, Profs. Emil Levasseur, E. Mascart, Paris (137); Mr. Samuel Timmins, Arley, Coventry, Eng. (Diploma and 138); Philosophical Society, Cambridge, Eng. (Trans., xvii, 1, 2, and 138); Royal Society (Trans., xvii, 1, 2, and 138); R. Meteorological Society, Royal Institution of G. B., R. Geographical Society, Victoria Institute, Mr. C. Juhlin Dannfeldt, Prof. William Crookes, Sirs Joseph D. Hooker, James Paget, Henry Thompson, London (138); Manchester Geographical Society (138); Natural History Society of Northumberland, Durham and New Castle-on-Tyne (138); Royal Society of Edinburgh (Trans., xvii, 1, 2, and 138); Royal Observatory, Edinburgh (138); Philosophical Society, Glasgow (138); R. I. State Agricultural Experiment Station, Kingston (137, 138); Prof. J. J. Stevenson, New York (138); Prof. W. Le Conte

PROC. AMER. PHILOS. SOC. XXX. 139. 2M. PRINTED JAN. 6, 1893.

Stevens, Troy, N. Y. (138); Prof. E. D. Cope, Mr. H. H. Houston, Philadelphia (138); U. S. Geological Survey, Washington, D. C. (Trans., xvii, 1, 2, and 138); Leander McCormick Observatory, University of Virginia (138); "Journal of Comparative Neurology," Granville, O. (138); Dr. Robert Peter, Lexington, Ky. (138); Kansas Academy of Science (138), Washburn College (137), Topeka; Prof. Daniel Kirkwood, Riverside, Cal. (138); Bishop Crescencio Carrillo, Merida, Yucatan (138).

Accessions to the Library were announced from the Comité de Conservation des Monuments de l'Art Arabe, Cairo; New Zealand Institute, Wellington; K. K. Mineralogische Gesellschaft, St. Petersburg; K. Zoologisch. Botanische Genootschap, 's Gravenhage; Genootschap van Kunsten en Wetenschappen, Batavia; Académie des Sciences, Cracow; K. K. Militär Geographische Institut, K. K. Geologische Reichsanstalt, Vienna; K. Akademie der Wissenschaften, Physiologische Gesellschaft, Berlin; Naturhistorischer Verein, Bonn; Verein für die Geschichte und Altertumskunde, Erfurt; Oberlausitzer Gesellschaft der Wissenschaften, Görlitz; Vogtländische Alterthumsforschende Verein, Hohenleuben; Verein für Vaterländische Naturkunde, Stuttgart; Mr. T. Cannizzaro, Messina, Italy; Ministère des Travaux Publics, Paris; Royal Society, London; University of Toronto; American Academy of Arts and Sciences, Mr. Samuel A. Green, Boston, Mass.; New York Agricultural Experiment Station, Geneva; Cornell University, Ithaca; Mr. William John Potts, Camden; New Jersey Historical Society, Newark; American Academy of Political and Social Science, Rev. S. F. Hotchkin, J. F. Sachse, Miss Rebecca Elmslie, Philadelphia; Weather Bureau, Hydrographic Office, U. S. Naval Observatory, Washington, D. C.; University of California, Berkeley.

The following decease of members was announced:

John G. Whittier, born December 7, 1802; died September 7, 1892.

Prof. Joseph Lovering, Cambridge, Mass., born December 25, 1813; died January 18, 1892.

Pending nomination 1242 and new nominations 1243 and 1244 were read.

On motion, the Society

Resolved, That Dr. Charles E. Sajous be appointed a delegate to represent this Society at the Congrès des Américanistes, to be held at Huelva in October, 1892, provided that the same shall entail no expense upon this Society.

And the Society was adjourned by the President.

Stated Meeting, October 7, 1892.

Present, 16 members.

President, Mr. FRALEY, in the Chair.

Correspondence was submitted as follows:

A circular letter from Prof. Edward C. Pickering, Cambridge, Mass., in regard to a large southern telescope, and soliciting funds for same.

Accessions to the Library were reported from the Government Geologist, Adelaide, Australia; Académie Royale des Sciences, Amsterdam; "Flora Batava," Leiden; Mr. G. Bauer, Agram, Hungary; K. K. Naturhistorische Hofmuseum, Vienna; Mr. Albin Weisbach, Freiberg, Baden; Verein für Naturkunde, Offenbach a. M.; Société Languedocienne de Géographie, Montpellier; University Library, Cambridge, England; Radcliffe Observatory, Oxford; Natural History and Antiquarian Society, Penzance; Royal Dublin Society; Department of Agriculture, Ottawa, Canada; Agricultural Experiment Station, Bangor, Me.; Pope Manufacturing Co., Boston; Harvard University, Cambridge; Mr. Andrew McFarland Davis, Salem; American Antiquarian Society, Worcester; Dr. George Eastburn, American Meteorological Society,

Public Opinion Co., New York; Numismatic and Antiquarian Society, Mr. Henry Phillips, Jr., Philadelphia.

Letters of envoy were received from the Académie des Sciences, Amsterdam; Radcliffe Observatory, Oxford, England; Zoölogical Society, London; Royal Dublin Society; Geological and Natural History Survey, Department of Agriculture, Ottawa, Canada.

Letters of acknowledgment were received from the Royal Society of Victoria, Melbourne (136); Naturforsch. Gesellschaft, Dorpat, Russia (134); K. Danske Videnskabernes Selskab, Copenhagen (136); Académie Royale des Sciences, Amsterdam (135, 136); Académie des Sciences, Cracow, Austria (136); Prof. Peter Tunner, Leoben (137); K. K. Central Anstalt für Meteorologie (138); Dr. Aristides Brezina, Vienna (137); Naturforschende Gesellschaft des Osterlandes, Altenburg (138); K. Meteorologische Institut (137), K. Geologische Landesanstalt u. Bergakademie (138), Berlin; Oberhessische Gesellschaft für Naturkunde und Heilhunde, Giessen (137); Geographische Gesellschaft, Hannover (136); K. Sächsische Gesellschaft der Wissenschaften (136), K. Sternwarte, Profs. Otto Böttlingk, I. Victor Carus (137, 138), Leipzig; Verein für Erdkunde, Metz (136); Verein der Freunde der Naturgeschichte, Mecklenburg (137); Naturwissenschaftliche Verein, Osnabrück (137); R. Biblioteca N. C., Firenze, Italy (136); R. Società Italiana D'Igiene, Milan (136); R. Biblioteca Universitaria, Pisa (136); R. Comitato Geologico D'Italia, Rome (137); Société de Geographie, Rédaction "Cosmos," Dr. E. Hamy, Profs. Abel Hovelacque, E. Levasseur, Paris (138); University Library, Cambridge, England (138); Linnean Society, London (138); Prof. W. Boyd Dawkins, Manchester, England (137, 138); Radcliffe Observatory, Oxford (134, 135, 136, 138, and Trans., xvii, 1 and 2); Tacoma Academy of Science (138); Prof. Joseph LeConte, Berkeley, Cal. (138); Prof. Robert W. Rogers, Carlisle, Pa. (138).

The Wyoming Historical and Geological Society presented a copy of "The Wyoming Memorial Medal" in white metal.

The deaths of Joseph Ernest Renan (Paris), October 2,

1892, æt. 70, and Thomas Chase (Providence, R. I.), October 6, 1892, æt. 66, were announced.

Prof. Daniel G. Brinton presented a paper entitled "Further Notes on the Betoya Dialect from Unpublished Sources."

Prof. E. D. Cope presented a paper on "The Phylogeny of the Vertebrata."

Also a paper on "Some Points in the Kinetogenesis of the Limbs of Vertebrata."

Pending nominations Nos. 1242, 1243 and 1244 were read.

The following report was presented from the Michaux Committee, and the resolution appended was, on motion, adopted:

TO THE AMERICAN PHILOSOPHICAL SOCIETY:

The Michaux Committee respectfully reports, that at a meeting of the Committee, held on September 16, 1892, a letter was received from Dr. J. T. Rothrock, enclosing the following list of the time and subjects proposed for the Fourteenth Course of lectures given under the auspices of the American Philosophical Society:

WEDNESDAY EVENINGS.

Nov. 9. Trees of Pennsylvania (illustrated).
" 16. History and Fertility of Soil (illustrated).
" 23. What is Economic Botany?
" 30. Plant Form Applied to Decorative Art (illustrated).
Dec. 7. Plant Structure Applied to Mechanical Art (illustrated).
" 14. How to Plant and Grow Trees.
" 21. How to Care for Trees.

It is expected that the lectures will be delivered in the Hall of the Academy of Natural Sciences, which has been kindly tendered to him by the Academy for that purpose.

The Committee approved of the proposition and requests the Society to make an appropriation of $244 out of the income of the Michaux Fund to meet the expenses of the lectures.

The Committee submits the following resolution, which it desires shall be passed by the Society:

"*Resolved*, That the sum of two hundred and forty-four dollars be appropriated out of the income of the Michaux Fund towards the expenses of the Fourteenth Course of the Michaux Forestry Lectures by Dr. J. T. Rothrock."

By order of the Committee,

J. SERGEANT PRICE, *Secretary*.

The following letter was read and the Curators were requested to report to the Society upon the request it contained:

PHILADELPHIA, May 20, 1893.

FREDERICK FRALEY, ESQ.,

President of the American Philosophical Society:

Dear Sir:—The Joint Special Committee appointed by the Councils of Philadelphia to secure a proper representation of historical and other exhibits from Philadelphia at the World's Columbian Exposition, to be held at Chicago, propose taking the Liberty Bell and other objects in possession of the city, and are desirous of securing additional relics. An inspection of the contents of the Hall of your Society convinced the Committee that an exhibition of the following objects in your possession would greatly add to the interest of Philadelphia's display, viz.:

1. Chair in which Thomas Jefferson wrote the Declaration of Independence.
2. Chair owned and used by Benjamin Franklin.
3. Electrical device invented by Franklin.
4. Chair of Joseph Bonaparte from his residence at Bordentown.
5. Polygraph used by Jefferson.
6. Unsigned copy of the Declaration of Independence made by Jefferson, with interlineations.

And other relics of historical and antiquarian interest.

Proper attention will be given to the care and preservation of all articles exhibited under the custodianship of the Committee.

I therefore earnestly request that your Society will take into consideration the proposition to permit the above-named articles to be exhibited at Chicago under the auspices of our Committee.

Yours truly,

ELIAS P. SMITHERS, *Chairman.*

The Secretaries were authorized to reprint four pages in Prof. Cope's paper on "The Osteology of the Lacertilia," and to distribute the same with the next number of the Proceedings.

And the Society was adjourned by the President.

OCTOBER 21, 1892, having been designated by the President of the United States and by the Governor of the State of Pennsylvania as a public holiday, no meeting of the American Philosophical Society was held on that evening.

Stated Meeting, November 4, 1892.

Present 14 members.

Vice-President, DR. RUSCHENBERGER, in the Chair.

Correspondence was submitted as follows:

An invitation from the Naturforschende Gesellschaft des Osterlandes, Altenburg, to be present at its seventy-fifth anniversary, October 8 and 9, 1892.

A circular from the University of Padua, announcing the commemoration of the four hundredth anniversary of the connection of Galilæo Galilæi with the University.

Letters of envoy were received from the Geological Survey of India, Calcutta; K. P. Meteorologisches Institut, K. Geologische Landesanstalt und Bergakademie, Editors of "Lateinische Litteraturdenkmäler," Berlin; Schlesische Gesellschaft für Vaterländische Cultur, Breslau; Department of the Interior, Washington D. C.; Direccion Général de Estadistica, Mexico.

Letters of acknowledgment were received from the Geological Survey of India, Calcutta (137); Dr. Otto Donner, Helsingfors, Finland (136–138); Société Imp. Mineralogique (137); Russian Chemical Society (137, 138); Central Physical Observatory (138); Imperial Academy of Sciences, St. Petersburg (138, and Trans., xvi, 1 and 2); R. Norwegian Society of Science, Throndhjem (137, 138); Société R. de Geographie, Antwerp, Belgium (125–130, 136–138); Société Hongroise de Geographie, Budapest (137, 138); Academy of Science, Cracow, Austria (137); Naturhistorisches Landesmuseum von

Karten, Klagenfurt, Austria (137); Dr. Hermann Rollett, Baden bei Wien (136, 137); Drs. Friederich S. Krauss, M. Much, Vienna (137, 138); Anthropologische Gesellschaft, Redaction der "Naturwissenschaftlichen Wochenschrift," Berlin (138); K. Meteorologische Institut, Chemnitz (138); Naturwissenschaftliche Gesellschaft "Isis," Dresden (137, 138); Vogtländische Altertumsforschende Verein, Hohenleuben (138); Verein der Freunde der Naturgeschichte, Mecklenburg (138); Geodätisches Institut, Potsdam (138); Würtembergische Verein für Handels-Geographie, Stuttgart (137); R. Instituto Lombardo di Scienze e Lettere, Milan (137); Societa Africana d'Italia, Naples (137); Marquis Antonio Di Gregorio, Palermo (137); Prof. G. Sergi, Rome (137); R. Osservatorio, Turin (137); Marquis de Nadaillac, Prof. E. Mascart, Paris (138); Prof. J. P. Postgate, Cambridge, Eng. (137, 138); Dr. Friederich Muller, Oxford, Eng. (137); Prof. James Geikie, Edinburgh (138); Dr. J. McK. Cattell, New York (138); Oneida Historical Society, Utica (137, 138); Mr. Cadwalader Biddle, Admiral E. Y. Macauley, Philadelphia (138); Smithsonian Institution (Trans., xvi, 1 and 2, and 132–136); Academy of Sciences, Chicago (137).

Accessions to the Library were reported from the Imperial Geographical Society, St. Petersburg; Société R. des Antiquaires du Nord, Copenhagen; K. K. Central-Anstalt für Meteorologie, etc., Vienna; Editors of "Naturwissenschaftliche Wochenschrift," "Lateinische Litteraturdenkmäler," Berlin; Schlesische Gesellschaft für Vaterländische Cultur, Breslau; Physikalisch-Medicinische Societät, Erlangen; Sächsische Geschichte und Alterthumskunde, Dresden; Senckenbergische Naturforschende Gesellschaft, Frankfurt-a.-M.; Verein für Thüringische Geschichte und Alterthumskunde, Jena; Verein für Lübeckische Geschichte, etc., Lübeck; Naturhistorische Gesellschaft, Nürnberg; Prof. F. von Sandberger, Würtzburg; Rédaction "Cosmos," Paris; Royal Society of Antiquaries, Dublin; Université, Laval, Quebec; Geological Survey, Ottawa; Bureau of Statistics of Labor, Massachusetts Historical Society, Athenæum, Boston; Harvard University, Cambridge;

Messrs. Thomas H. Dudley, William John Potts, Camden; Bureau of Statistics of New Jersey, Trenton; Academy of Natural Sciences, Editors of the "Medical and Surgical Reporter," Messrs. MacCalla & Co., Levytype Co., Messrs. John F. Lewis, Henry Phillips, Jr., Philadelphia; National Academy of Sciences, Smithsonian Institution, Census Office, War Department, Washington, D. C.; Colorado Scientific Society, Denver; Direccion Général de Estadistica, Mexico.

The decease of the following members was announced:

Dr. Pliny Earle, Northampton, Mass., May 17, 1892, æt. 83.

Sir Daniel Wilson, Toronto, August, 1892, æt. 77.

James B. Francis, Lowell, Mass., September 17, 1892, æt. 78.

Dr. Brinton read a paper "On the Etrusco-Libyan Elements in the Song of the Arval Brethren."

Pending nominations Nos. 1242, 1243 and 1244, and new nomination No. 1245 were read.

The Committee on Publication reported in favor of the publication of Dr. Hilprecht's Assyrian Transcripts, which was agreed to and publication ordered in the Transactions.

Dr. Morris, on behalf of the Curators, presented a report on the portrait owned by the Society labeled Francis Hopkinson, stating that in their belief it was that of Samuel Vaughan.

Mr. Fraley gave what in his opinion were the facts of the case. On motion of Mr. Fraley, the Society resolved to place the name of Samuel Vaughan on the portrait referred to.

And the Society was adjourned by the presiding member.

Stated Meeting, November 18, 1892.

Present, 11 members.

Mr. THOMAS H. DUDLEY in the Chair.

Correspondence was submitted as follows:

An invitation from the Historical Society, Chicago, to be

present at the laying of the cornerstone of their new building, November 12, 1892.

New exchanges ordered: Naturforscher-Gesellschaft, Dorpat, Russia; Université Laval, Quebec, Canada; Société d'Historie et d'Archæologie de Chalon-sur-Saone, Montbéliard, France.

Letters of acknowledgment were received from the Société Imperiale Mineralogique (138, and Trans., xvii, 1, 2); Comité Géologique de la Russe (137, 138); Prof. Serge Nikitin, St. Petersburg (136, 137, 138); Musée R. d'Histoire Naturelle de Belgique, Bruxelles (135–138); K. Universitetet, Lund, Sweden (137); K. Bibliothek (137); Gesellschaft für Erdkunde, Berlin (138); Naturwissenschaftlicher Verein, Bremen (138); K. Sächsischer Altertumsverein, Dresden (137); Senckenbergische Naturforschende Gesellschaft, Frankfurt a. M. (135); Prof. E. Hæckel, Jena (136, 137); Naturwissenschaftlicher Verein, Kiel (135–137); Societa Africana d'Italia, Naples (138); R. Biblioteca Universitaria, Pisa (137); R. Accademia dei Lincei (138); Prof. G. Sergi, Rome (138); Société d'Borda, Dax (137); Société des Sciences Naturelles et Archéologiques de la Creuse, Guéret (137); Société des Antiquaires de la Morinie, St. Omer (137); Geological Society, London (137); Royal Geological Society of Ireland, Dublin (137, 138, and Trans., xvii, 1, 2); Instituto Fisico, Geografico Nacional de Costa Rica; San José de Costa Rica, A. C. (96–130, 136, 137).

Letters of envoy were received from the Faculté des Sciences, Marseille; Musée Guimet, Société Philologique, Paris; Royal Statistical Society, London; Department of the Interior, Washington, D. C.

Accessions to the Library were reported from the Asiatic Society of Japan, Yokohama; Verein für Kunst und Alterthum in Oberschwaben, Dr. Reinold Kapff, Ulm, Würtemberg; Société des Antiquaires de Picardie, Amiens, France; Société des Sciences Physiques et Naturelles, Commission Météorologique de la Gironde, Bordeaux; Faculté des Sciences de Marseille; Société d'Histoire et d'Archéologie de Chalon-sur-Saone, Montbéliard; Société d'Anthropologie, Société

Philologique, Musée Guimet, Paris; Société des Antiquaires de la Morinie, St. Omer; Editors of the "Yale Review," Boston; Royal Society of Canada, Montreal; Dr. Daniel G. Brinton, Mr. Henry Phillips, Jr., Philadelphia; Miss R. C. Longstreth, Sharon Hill; Hydrographic Office, Department of the Interior, Washington, D. C.

Photographs of Dr. John J. Stevenson, New York, and Mr. M. Fisher Longstreth, Sharon Hill, Pa., were received for the Album.

Dr. W. P. Wilson presented for the Transactions a paper by James Ellis Humphrey on "The Saproleginaceæ of the United States, with Notes on Other Species." On motion the paper was referred to a Committee of three members of the Society, to be appointed by the President at his leisure.*

The Secretaries presented a "Kwakiutl Vocabulary," by Dr. Franz Boaz (of Worcester, Mass.).

Mr. Lorin Blodgett exhibited a cosmical map of the Northern Hemisphere, and made some remarks thereon.

Dr. Cope read a paper on "A False Elbow in a Horse."

Pending nominations Nos. 1242, 1243, 1244, and new nominations Nos. 1245, 1246, 1247 and 1248 were read.

Dr. Morris as Curator placed before the Society some of the interesting articles found by him in the museum, such as the theodolite belonging to the Proprietor's family, used in laying out the lots of Philadelphia, and on Mason and Dixon's line, presented by Dr. Physick; the model of a mowing machine presented in 1771; of a fire-escape, by Rev. Dr. Collin, in 1791; of a bathometer deposited by Jefferson in 1806; of a torpedo-boat, by Fulton, in 1815, etc.

Dr. Morris suggested the following heads as useful for classifying the cabinets, at least temporarily, viz.:

Objects illustrating American antiquities, such as the Peale collection, the Poinsett collection, and many Indian relics.

Objects illustrating progress of science and art, and the history of thought in other countries.

* The President subsequently appointed as said Committee, Dr. Rothrock and Messrs. Meehan and Martindale.

Objects illustrating mechanical arts and appliances, for agriculture, commerce, navigation, etc.

Geological, mineralogical and botanical specimens—in the latter class are many of great value, including Muhlenberg's Herbarium.

Scientific instruments, and instruments of precision—some of them rare and possessing great historical value.

Miscellaneous objects of interest to the student of the progress of human thought and civilization.

On motion the Curators were authorized to have framed for display a series of plaster medallions.

And the Society was adjourned by the presiding member.

Stated Meeting, December 2, 1892.

Present, 13 members.

President, Mr. FRALEY, in the Chair.

Correspondence was submitted as follows:

Letters of envoy were received from the K. Sächsische Gesellschaft der Wissenschaften, Leipzig; Zoölogical Society of London; Hon. Henry C. Baird, Philadelphia.

Letters of acknowledgment were received from the Royal Society of Victoria, Melbourne (138); Prof. Japetus Steenstrup, Copenhagen (138); K. Zoologisch. Botanische Genootschap, 'S Gravenhage, The Hague (138); Kolonial Museum (137, 138); Fondation de P. Teyler van der Hulst, Harlem (137, 138, and Trans., xvii, 1, 2); Akademija Umiejetnósci, Krakau, Galicia (138); Prof. Peter von Tunner, Leoben, Styria (138); Dr. Aristides Brezina, Vienna (138); Deutsche Geologische Gesellschaft, Berlin (138).

Accessions to the library were reported from the Geological Survey of India, Calcutta; Société Finno-Ougrienne, Helsingfors; Naturforscher-Verein, Riga; K. D. Videnkaberns Selskab, Copenhagen; Naturforschende Gesellschaft, Emden; Dr. James Henry's Trustees, Dublin, Ireland; Société de

l' Histoire de France, Marquis de Nadaillac, Prof. Paul Topinard, Paris; Victoria Institute, London; University of the State of New York, Albany; Mr. Mark V. Slingerland, Ithaca; Mr. Henry Phillips, Jr., Philadelphia; Bureau of Education, Prof. Cleveland Abbe, Washington, D. C.; Observatorio Astronómico Nacional de Tacubaya, Mexico; Société Scientifique du Chili, Santiago.

The Committee on Dr. J. E. Humphrey's paper was continued.

The report of the Treasurer was read and referred to the Finance Committee.

The report of the Publication Committee for the year was made.

The report of the Library Committee was approved.

On motion, Prof. Cope was permitted to withdraw the paper presented by him at the last meeting, and to substitute therefor one on "False Elbow Joints."

Pending nominations Nos. 1142 to 1248, and new nominations Nos. 1249 and 1250 were read.

And the Society was adjourned by the President.

Stated Meeting, December 16, 1892.

Present, 18 members.

President, Mr. FRALEY, in the Chair.

Correspondence was submitted as follows:

A letter from the K. K. Geographische Gesellschaft, Vienna, discontinuing exchanges with the Society, as it has determined in future only to exchange with Geographical Societies.

A circular from the Comité G. A. Hirn, Colmar, Alsace, soliciting subscriptions for the completion of the monument to be erected to Prof. G. A. Hirn.

A letter from Mr. Harold Goodwin, Philadelphia, a new member, apologizing for not having previously taken his seat.

Letters of envoy were received from Mr. Henry Carey Baird, Philadelphia; Library of Oberlin College, Oberlin, O.; Texas Academy of Science, Austin.

Letters of acknowledgment were received from the Institut Egyptien, Cairo (136, 137); Prof. Francis Pulzsky, Budapest, Hungary (134, 136–138); University of Bonn (138); Naturforschende Gesellschaft, Freiburg i. B. (138); Dr. Albin Weisbach, Freiberg, Saxony (137); Prof. Dr. Doëderbeen, Strassburg, Alsace (135–138); I. R. Accademia Degli Agiate Rovereto, Tyrol (137); Société Geologique de France, Paris (137, 138).

Accessions to the Library were reported from the Physikalisch-Œkonomische Gesellschaft, Königsberg; Nassauische Verein für Naturkunde, Weisbaden; Societá Africana D'Italia, Naples; Naturforschende Gesellschaft, Zurich; Instituto y Observatorio de Marina, San Fernando; Royal Astronomical Society, London; Hon. R. C. Winthrop, Astronomical Observatory of Harvard College, Cambridge, Mass.; Geological Society of America, Rochester, N. Y.; Dr. Charles A. Oliver, Messrs. Abraham Jordan, Henry Phillips, Philadelphia; U. S. Coast and Geodetic Survey, Bureau of Education, Washington, D. C.; Oberlin College; Texas Academy of Science, Austin; Free Public Library, San Francisco, Cal.

The Committee upon Dr. Humphrey's paper for the Transactions reported it worthy of publication, which was so ordered and the Committee discharged.

This being the regular evening for the election of members, pending nominations Nos. 1242 to 1248 were read, spoken to and balloted for.

New nominations Nos. 1249, 1250 and 1251 were read.

The death of Dr. John S. Newberry, December 7, 1892, æt. 70, was reported.

The report of the Finance Committee was presented and the appropriations for the ensuing year were passed.

The Curators presented the following report:

CURATORS' REPORT UPON THE SOCIETY'S RESOLUTION OF MAY.

1. The Curators respectfully state that the cataloging and labeling of the Poinsett and Keating collection beyond that which has been already done is impracticable under present conditions. And we would suggest that such a proposition as that involved in the Society's resolution is a matter demanding the consideration and personal supervision of a specialist in American archæology.

2. Before it is possible to determine where the collection will best serve the purposes of ethnological study, the Curators believe that this Society should have an official declaration from the Academy of Natural Sciences: First, as to its desire to retain it. Secondly, as to the manner of display which the Academy would guarantee for it, and any conditions which the Academy would propose to put upon the retention of the aforesaid collection as a loan from this Society.

PATTERSON DU BOIS, *Chairman.*
J. CHESTON MORRIS,
(as to Section 1 only.)
R. MEADE BACHE.

Dr. Morris from the Curators presented a minority report as to the second section of their communication as follows, viz.:

Whereas, The Museum of the Society is now in a fireproof building, and has space where the Keating and Poinsett collections can be well displayed for purposes of study, and the reasons for its deposit in the care of the Academy of Natural Sciences no longer exist; therefore, be it

Resolved, That the Academy of Natural Sciences be requested to return these collections in accordance with the terms of deposit.

J. CHESTON MORRIS, M.D.,
one of the Curators.

Dr. Morris moved that the Academy of Natural Sciences be requested to return the said Poinsett, etc., collection.

Mr. Williams moved, as an amendment, that the majority report be adopted.

After a discussion the amendment was adopted and the majority report was agreed to.

The request of Dr. Elliott Coues for the withdrawal of the Lewis and Clark Note-books, accompanied by proper vouchers, was read.

Dr. Morris moved that the subject be referred to the Library Committee with power to act.

Mr. Price offered the following substitute, which was accepted by Dr. Morris and adopted by the Society.

Dr. Coues, a member of the Society from Washington, having presented a request to the Society that the Lewis and Clark papers deposited with the Society, on April 8, 1818, under a receipt of that date be loaned to him for the purpose of preparing a new edition of the travels of those gentlemen, it was on motion of Mr. Price:

Resolved, That the Librarian be authorized to lend to Dr. Coues all the papers now in our possession deposited by Lewis and Clark in the year 1818, as per said receipt, he taking from the doctor his obligation (with a sufficient penalty) to take care of them, keep them when not in his library in some safe deposit vault at Washington, and return them at the expiration of three months unless further time shall be given to him to retain them.

Mr. Williams offered the following resolution, which after discussion was adopted:

Resolved, That the Curators of the Society be requested to report upon the cost of placing the Poinsett and Keating collection in this Museum and caring for it, and upon other collections or institutions in this city, if any, with which this collection could be deposited with advantage to the cause of science and the study of this collection, and upon some plan for arranging the collections of the Society in its Museum in accordance with the wishes, if any, of the donors of different collections.

The result of the balloting for members was reported to the President, who declared the following named to have been duly elected members of the Society.

2205. Mr. Charles H. Cramp, Philadelphia.
2206. Prof. Samuel G. Dixon, M.D., Philadelphia.
2207. Prof. John M. Macfarlane, D. Sc., Lansdowne, Phila.
2208. Prof. Francis X. Dercum, M.D., Philadelphia.
2209. Prof. James Ellis Humphrey, D. Sc., Amherst, Mass.

And the Society was adjourned by the President.

The Etrusco-Libyan Elements in the Song of the Arval Brethren.

By D. G. Brinton, M.D., LL.D.

(*Read before the American Philosophical Society, November 4, 1892.*)

In two communications to the American Philosophical Society, published respectively in 1889 and 1890, I offered a series of considerations which led me to believe that there existed an affinity, or ethnic relationship, between the ancient Etruscans and the Libyans, or Berber tribes, of North Africa.* In the present paper I would supplement what I there said by a brief study of the Etrusco-Libyan elements in one of the oldest literary monuments of Roman antiquity—the Song of the Arval Brethren.

These *Fratres Arvales* were a priestly sodality, which, according to tradition, dated back to the foundation of Rome, Romulus himself having been one of the twelve members of which the sacred college was composed. Their function was to perform certain acts of worship at a festival in the month of May in honor of "the divine goddess" *Dea Dia*, whose proper name is nowhere mentioned. The object of the festival was propitiatory to the divinities of agriculture, that the fields might yield bounteous harvests; whence the brotherhood derived its name—*ut ferunt fruges arva.* The rites consisted of sacrifices, processions, and, at a certain stage of the proceedings, of the repetition of a very ancient song, the words of which, as being too archaic for the members, were in the time of the Empire written down in small books, which the Brethren held in their hands as they chanted.

Although classical authors scarcely mention the Arval Brethren, we have very minute accounts of their rites, for it was their laudable custom at the close of each annual festival to inscribe the fact of the celebration with its date and some other particulars on a slab of stone. Nearly one hundred of these memorials have been discovered from time to time, and on one of the tablets, exhumed in 1778, recording the annual festival in May, A.D. 218, the Brethren had the happy idea to cause the song itself to be inscribed. They apparently gave the "copy" to the local stonecutter, and did not stay to read the proof, for he has made several palpable blunders, such as spelling the same word differently in different

* "The Ethnologic Affinities of the Ancient Etruscans," *Proc. Amer. Phil. Soc.*, Vol. xxvi; "On Etruscan and Libyan Names," *ibid.*, Vol. xxviii.

lines; but, as each line is repeated three times, we have a strong check on his vagaries. All critics agree, however, as to its value as a monument of antiquity, and one of its most recent editors does not go too far when he calls it "by far the most venerable specimen of Latin which we possess."*

Its interpretation has tasked the ingenuity of the learned; but, before I proceed to that, I will recall some facts about the origin of this priestly sodality. It was distinctly and wholly Etruscan, and was traditionally connected with the woman, Acca Larentia, and her Etruscan husband, Tarrutius. There are many stories told about Acca, and there are, according to some, a false and a true Acca; but those well acquainted with the kaleidoscope of mythology will find no difficulty in reconciling the beautiful and notorious Acca who was chosen, along with a plenteous board and a skin of old wine, to make merry the night with Hercules; the lascivious Acca, whom shepherds called *Lupa*, for she was as "salt as wolves in pride;" with the Acca who ruled the Lares, guardian spirits of the virtuous household, as her by-name *Larentia* indicates. As for her forename, *Acca*, *Αχca*, it occurs in Etruscan inscriptions, though its form has been doubted by some good scholars.

The story—or one of the stories, and the most consistent—ran that Hercules, after his joyous rendezvous, gave her the extremely sane and modern advice to marry the first rich man she could capture. This proved to be the worthy Tarrutius, by whom she achieved the noble maternity of twelve sons, all of whom grew to manhood; and the position in the envied fraternity of the first who died was promptly taken by Romulus, who had already made a name for himself by plowing his furrow around the Palatine Hill, and declaring himself master of the situation. Acca survived her husband, inherited all his property, as the Etruscan custom was, and left it all by will to the Roman people, while her sons, along with Romulus, constituted themselves a holy brotherhood, pledged to call upon the ancient gods of their mother's religion once every year, in the springtime, to bless the fields, and send plenteous returns for the farmer's toil.

Such were the Arval Brethren; and in the pleasant Maytime of each year they met and fared forth from Rome along the Via Campana for five miles, when they reached the grove and temple

* F. D. Allen, *Remnants of Early Latin*, p. 66.

of the Dea Dia. There they spent three days—a charming escapade, no doubt, from city life—slaughtering a white heifer, also some specially fed young pigs, *porcilias piaculares*, and not forgotten by neighboring farmers with delicate spring vegetables, as we may gather from the records. Then came the antique song and solemn dance in the temple of the Goddess, the Brethren clad in quaint traditional garb, and crowned with wreaths of leaves and early wheat.

We may well suppose that with this history and these customs we should look among the Arval Brethren for true folklore, for the preservation of some of the ancient names and ideas of the Etruscan religion, in a day when they had quite passed out of the ken of the current worship and mythology of Rome. The place to look for it, of course, is in their Song, and I think we find it there with a plainness that cannot be mistaken, and yet which none of the commentators and critics has heretofore brought out, or even referred to.

The accurate text of that Song is subjoined. In giving it, I choose, in cases of discrepancy, where the majority of the sculptor's readings--that is, two out of three—are the same.

The Song.

ENOS LASES IVVATE
ENOS LASES IVVATE
ENOS LASES IVVATE

NEVE LVERVE MARMAR SINS INCVRRERE IN PLEORES
NEVE LVERVE MARMAR SINS INCVRRERE IN PLEORES
NEVE LVERVE MARMAR SINS INCVRRERE IN PLEORES

SATVR FVFERE MARS LIMEN SALI STA BERBER
SATVR FVFERE MARS LIMEN SALI STA BERBER
SATVR FVFERE MARS LIMEN SALI STA BERBER

SEMVNIS ALTERNEI ADVOCAPIT CONCTOS
SEMVNIS ALTERNEI ADVOCAPIT CONCTOS
SEMVNIS ALTERNEI ADVOCAPIT CONCTOS

ENOS MARMOR IVVATO
ENOS MARMOR IVVATO
ENOS MARMOR IVVATO

TRIVMPE TRIVMPE TRIVMPE TRIVMPE TRIVMPE

The translation of the first line offers no particular difficulty, as the initial *E* is prothetic and strengthening, and there are plenty of examples where *s* is preserved between two vowels for later *r*. Nor about line second is their serious controversy. The compound *iverve* may fairly be *luem ruem* (*ruinam*), and we may render:

> "Help us, O Lares;
> And, O Marmar, let not blight nor ruin fall upon the flowers."

Or, perhaps, instead of *pleores* = *flores*, we may take it *pleores* = *piures*, and translate "upon the multitude," though this has less pertinence.

But the third line is where the commentators have broken down. The latest authority within my reach, Prof. Allen, of Yale College, gives it up as hopeless, and leaves it untranslated. Mommsen proposes that it shall be split in two, one half an appeal to the gods, *Satur esto, fere mars!* "Be satiate, fierce Mars," and the other half to the individual brethren, *In limen insili! Sta! Verbera* (limen)!

This is terribly strained. Mars was not a fierce deity, nor god of war to the Etruscan, but of peace, of agriculture, and of the springtime. He was guardian of the husbandman, not of the warrior. The word *Berber* is repeated three times, without any variation, and is plainly a reduplicated proper name, like *Marmar* in the previous line, to which it bears a distinct rhythmical relation. The stonecutter would not have made the same error three times over in such a common word as *verbera*, if that had been his copy. For these reasons, and others which he himself advances, and which, being of a purely scholastic character, I need not quote, the distinguished linguist of the Collège de France, Prof. Michel Bréal, proposes the reading:

> "Sata tutere, Mars; clemens satis esto, Berber."

He is convinced that we must accept the last word as *Berber*, but as to its significance he is at a loss, and suggests that it may be "une variante de Marmar."

This suggestion has not been admitted even by those who accept his reading. They have presented various guesses; none near the mark, if we may judge by their reception.* But suppose, along

* See Ch. Schæbel, in *Actes de la Société Philologique*, Tome xiv, p. 200 *sq.*

with Lases, Marmar and Mars, it is a more or less Latinized form of a pure Etruscan word, what could we make of it?

The first difficulty is that the Etruscan probably had no *b*, in which they resembled many of the modern Berber dialects, where it is also lacking. There was some intermediate labial in Etruscan which the Romans rendered by either *f*, or *v*, or *b*. Probably it was close to the Greek digamma, *F*. Did the Etruscans have a god *Fer*, or *Ver?* Undoubtedly. That was the exact name of the deity whom Varro calls *Deus Etruriæ princeps*, "chief of all the gods of Etruria." The Latin writers give his full name as Vertumnus; but that the last two syllables do not belong to the name, but constitute an appellative suffix, the analogy of the Etruscan words *Vol-tumna*, *Luχumna*, and many others, has long since convinced Etruscologists.*

The functions of this god *F*er were most appropriate to the rites of the Arval Brethren. The gardens of the spring, the harvests of the summer, but especially the maturing grain and fruit of the autumn, were his special care. Thus he came to be a chief god, one who looked after home life and works. He was the culture-hero of the Etruscans, analogous to such figures as Michabo and Viracocha in native American mythology.

But here a striking identity meets us. Among the Libyans of Northern Africa this same divinity, with the same attributes and the same name, appears to meet us. Their chief god was also *Ber* (*Fer*, *Ver*); he was their protector and mythical ancestor; from him they claimed their name, *Berbers*, *Brebres*, etc.; and to this day the secluded tribes of the Sahara point to sacred spots where their famed progenitor and teacher was buried.†

It would be an easy error to suppose that *Ver* was the Latin word for spring from the Greek, and that in the Pantheon *Ver* was the personation of the season of spring; but this was not the case. The *Vertumnalia* were in the fall of the year, in the month of October, and were never supposed to have reference to any such

* See Deecke, note to Müller, *Die Etrusker*, Bd. ii, s. 51 *et al.* In some of the Latin geographers the name Berenice, that of a Libyan city, is spelled Verenice (Borsari, *Geografia della Tripolitana*, p. 191).

† "L'ancêtre commun de toutes les tribes berbères," Duveyrier, *Les Touaregs du Nord*. He is the *Iarbas* of Greek legend, son of Jupiter Ammon and a Libyan nymph, and king of the Getuli, to escape whose pressing solicitations Queen Dido plunged the sword into her own bosom. His immediate descendants are still referred to by the Touaregs as the *Iabbaren*.

impersonation. This fact brings out the antithesis in the line between the two divinities named. Marmar was the god of the early season and of the spring crops, Berber or Ver of the autumn and the late crops, and this was the reason for bringing them together in this adjuration for the fertility of the fields.

The meaning of Ber in the ancient Libyan language I have partly discussed elsewhere. It is from the biliteral root **B R**, the primitive meaning of which was "to overflow," or something equivalent to that idea. Applied to population, it was "to migrate," "to journey forth," and, as only freemen could have that privilege, it came to mean "to be free," and it was apparently in that proud significance in which it was adopted a patronymic. In its earlier sense it was and is applied to water which boils over, and in a neuter form it signifies "to be in excess," "to be abundant," and hence "to abound in," "to be fruitful in" (*foissoner*). Here we see where the meaning of *Ver* comes in, as the god of the harvest, of the fruitage and the vintage.

In the ancient Numidian epigraphy we find this name repeatedly inscribed on tombstones, usually with a similar suffix, *Vermim*, *Vermimo*, *Vermima*,* in which we easily see the biliteral Berber radical **M M**, from which are derived the terms for both mother *Imma*, and son *Emmi*. Whether the termination *-umnus*, so common in Etruscan names, and occasionally written *ummus* (*lucumno*, *lucummo*), is not this same termination may be suggested, in which case *Vertumnus* would mean "Son of Ber." And, in this connection, I must not omit to mention that precisely the reduplicated form *Marmar* is found on Numidian inscriptions two or three centuries before our era.†

Passing to the fourth line of the Song, its first word seems a stumbling block. Some think *semones* is an abbreviation of *semihomines*, and means "demi-gods;" others would derive it from *sero*, *semen*, and take it to refer to gods of sowing, and hence agricultural; while Mommsen understands it as *se-homines*, "apart from men," applied to divinities in general. Most authorities suppose *advocapit* to be a mistake for *advocabite;* and the translation

* See Halévy, *Essai d'Epigraphie Libyque*, Inscriptions 7, 22, 23, 24, and others. The termination *mim* occurs in other inscriptions, as No. 47, *Uba-mim;* No. 152, *Ar-mima*, etc.

† As in Halévy's collection, No. 100, etc. The Libyan general conquered by Pharaoh Merenptah was named Marmariu, "Son of Marmar." The radical **M R**, in the Berber dialects, means "to be great" and "to be old," the ideas of age and power being in them, as in so many tongues, synonymous.

of the line is given, "Call ye, in turns, on all the Semones." I should prefer to consider that *semones* refers distinctively to the two gods named *Marmar* and *Berber*, and that *advocapit* is an abbreviated form of the passive future, used impersonally, while *conctos* should have its original meaning, not "all," but "conjoined," "united," referring solely to the two divinities who are appealed to in the Song. It should then be rendered, "To these united gods of the crops (*i. e.*, the one of the early, the other of the later, season) praise shall be rendered."

The last lines offer no particular difficulties, so I offer this free paraphrase of the whole Song:

THE SONG OF THE ARVAL BRETHREN.

Come to our aid, O Lares!
O Marmar! Let nor blight nor ruin fall upon the flowers.
The sown seeds, O Marmar! protect; and favor the product, O Berber!
Praise shall be paid in turn to these associated gods of the crops.
Come to our aid, O Marmar!
Shout for joy! shout for joy! shout for joy!

The similarities which I here point out have an additional interest in the light of some recent discoveries in Egyptian archæology.

It has been generally accepted that the Tur-sha, who, about the close of the thirteenth century B.C., invaded Egypt from the West along with the Libyans, were Etruscans; but only recently has it been shown by conclusive evidence that the Etruscans continued to live in the Western Fayoom and on the Libyan boundary of Egypt for many centuries afterwards. One part of this evidence is from Egyptian inscriptions. At Medinet Gurob, close to the Libyan boundary, Mr. Flinders Petrie exhumed the coffin of a man bearing the inscription *An-en-Tur-sha*, "A man of the Tur-sha," showing that prominent citizens of Egypt (the coffin was that of a wealthy person) were at that time recognized as of the *Tur-sha* blood.

Still more extraordinary was the discovery of an Etruscan Ritual Book in this portion of Egypt, the celebrated Agram Codex, which has lately been published by Prof. Krall, of Vienna. He considers it conclusive as to the existence of an Etruscan settlement in this part of the Egyptian dominions.*

* *Die Etruskischen Mumienbinden des Agramer National-Muscums*, ss. 18, 19 (Wien, 1892). He quotes and discusses Petrie's researches at Medinet Gurob.

Such facts lead us to inquire particularly as to what we know from the oldest authors concerning the population of the territory immediately west of lower Egypt. On turning to the best and oldest authority, Herodotus, who obtained his information from members of the Greek colony at Cyrene, I was surprised to find that he locates precisely in the region referred to a tribe whose name, as he gives it, is evidently that of the Tur-sha—to wit, the *Adurmachides.** It is possible that *machides* is a Cyrenaic Greek termination, meaning "warriors;" at any rate we have the stem *Adur* or *Atur*, which is precisely what recurs in *Etruria*. It is undoubtedly a Libyan word, from the root DR or DR'R, whence the words for mountain, *adar* or *adrar*. The *Tur-sha* were, therefore, the mountaineers, those dwelling in the range of mountains which rise to form the eastern Libyan plateau. The analogy between *adar* and *adrar* on the one hand, and *adur* and *etrur*, on the other, is very noticeable. As the Italian Etruscans made little use of the letter *d*, substituting for it the *t*, we have the very common Tuscan radical *tur* or *tar*, as in the name of the field which the mother of the Arval Brethren on dying left to Romulus, the *ager turax* or *tarux*.†

* He assigns their position as "from the borders of Egypt to Port Plynus," and distinguishes them from the Ammonii of the Oasis of Jupiter Ammon, the modern El Giwah (*Hist.*, Book iv, cap. 168). The latter to this day speak a well-marked Berber dialect, as is proved by the short vocabulary collected by Bayle St. John.

† Both orthographies are sanctioned by Müller, *Die Etrusker*, Bd. ii, s. 107.

INDEX TO VOL. XXX.

Stated Meetings Held.

	Page.		Page.
1892, January 1	1	1892, May 20	263
January 15	106	September 2	291
February 5	110	September 16	300
February 19	112	October 7	303
March 4	117	November 4	307
March 18	120	November 18	309
April 1	254	December 2	312
May 6	256	December 16	313

New Members Elected.

February 19, 1892.

No. 2199.	George William Curtis	New York . . . 117
2200.	Anthony J. Drexel	Philadelphia . . . 117
2201.	Edward A. Leech	Washington, D. C. . . . 117
2202.	Seth Low	New York . . . 117

May 20, 1892.

No. 2203.	Harold Goodwin	Philadelphia . . . 268
2204.	Joseph D. Potts	Philadelphia . . . 268

December 16, 1892.

No. 2205.	Charles H. Cramp	Philadelphia . . . 316
2206.	Samuel G. Dixon	Philadelphia . . . 316
2207.	John M. Macfarlane	Lansdowne, Phila . . . 316
2208.	Francis X. Dercum	Philadelphia . . . 316
2209.	James Ellis Humphrey	Amherst, Mass . . . 316

Decease of Members.

Montgomery C. Meigs	107	C. A. Dohen	265
Addison May	107	August William Hoffman	265
Edward Penington	107	Miers Fisher Longstreth	291
Jean Louis Armand de Quatrefages	107	H. Burmeister	291
Paul Hunfalvey	111	John R. Baker	291
Andrew C. Ramsay	111	George William Curtis	291
Thomas Jefferson Lee	111	John G. Whittier	302
Joseph C. Garrison	111	Joseph Lovering	303
Theodore Mommsen	115	Ernest Renan	304
T. Sterry Hunt	115	Thomas Chase	305
John Couch Adams	121	Pliny Earle	309
Thomas Hockley	121	Daniel Wilson	309
D. Hayes Agnew	255	James B. Francis	309
Ario Pardee	255	John S. Newberry	314

PROC. AMER. PHILOS. SOC. XXX. 139. 2P. PRINTED JAN. 13, 1893.

Obituary Notices.

Page.

Obituary Notice ordered—Joseph F. Garrison by William John Potts 111
T. Sterry Hunt by James Douglass 116
Arlo Pardee by W. A. Ingham 255
D. Hayes Agnew by William Pepper 255
Obituary Notices read 135, 255
Obituary Notice received from Linnean Society of New South Wales 117
Manchester Geographical Society 110
Musée D'Oaxaca, Mexico 257

Officers and Council.

Election of. 1, 3
Proceedings of. 116, 265

Acceptance of Membership.

Anthony J. Drexel. 117
Seth Low. 117
George William Curtis 117
Joseph D. Potts 291
Harold Goodwin 300

Written Communications.

Page.

BACHE, R. MEADE.

Civil and Military Photogrammetry 229, 261

BAUR, GEORGE.

Taxonomy of the Genus Emys, C. Duméril 3
Addition to the Note on the Taxonomy of the Genus Emys, C. Duméril . . 245, 262

BOAZ, FRANZ.

Kwakiutl Vocabulary 311

BONWILL, W. G. A.

Geometry and Mechanics Deny Evolution. 112, 119

BRINTON, DANIEL G.

Observations on the Chinantec Language of Mexico. 22, 108
On the Mazatecan Language of Mexico, and Its Affinities. 108
Studies in the South American Native Languages 112
Further Notes on Fuegian Languages 249, 261
Further Notes on the Betoya Dialects; from Unpublished Sources 271, 305
On the Etrusco-Libyan Elements in the Song of the Arval Brethren 309, 317

COPE, EDWARD D.

A Synopsis of the Species Tied, Genus Cnemidophorus 3
The Homologies of the Posterior Cranial Arches in the Reptilia. 111, 112
Tiaporus, a New Genus of Teiidæ 119
A Contribution to the Vertebrate Paleontology of Texas 123
The Osteology of the Lacertilia 185, 255, 306
Some Little-known Palæozoic Vertebrates. 255
On the Skull of the Dinosaurian Lælaps Incrassatus 240, 262
On the Phylogeny of the Vertebrata. 278, 305
On Some Points in the Kinetogenesis of the Limbs of Vertebrates 282, 305
On False Elbow Joints 285, 313
A False Elbow in a Horse 311, 313

HEILPRIN, ANGELO. *Page.*

The Temperate and Alpine Floras of the Giant Volcanoes of Mexico. 4, 108

HUMPHREY, JAMES ELLIS.

The Saprolegniaceæ of the United States, with Notes on Other Species 311

KIRKWOOD, DANIEL.

On the Mutual Relations Between the Orbits of Certain Asteroids 269, 300

PHILLIPS, HENRY, JR.

A Second Contribution to the Study of the Folklore of Philadelphia and its Vicinity 122, 246

RUSCHENBERGER, W. S. W.

A Sketch of the Life of Joseph Leidy 135

Oral Communications.

BLODGETT, LORIN.

A Cosmical Map of the Northern Hemisphere. 311

COPE, EDWARD D.

On the Geology of the Staked Plains of Texas 116

Miscellaneous.

American Chemical Society, New York, announcement of fifth general meeting. . . 292
Babylonian Tablets 120, 266, 309
Bache, R. Meade, resolution by, decoration of meeting room 122, 267
Blodgett, Lorin, letter from, in regard to a National University to be erected in Washington, D. C. 292
Books of reference purchased 116
Buffalo Historical Society, invitation from, to unveiling of statue of Red Jacket. . . 292
Busts of Lafayette and Franklin loaned to the University Lecture Association . 122, 257
Claudio, Jannet, letter from 257
Coins of the Society 268
Columbian Celebration, letter from Committee of Philadelphia Councils on the . 263, 306
Committees:
Standing Committees 107
On Michaux Legacy 108, 305
On Columbian Celebration 112, 256
On Sesqui-Centennial Anniversary 265
On Henry M. Phillips' Prize Essay Fund 108
On Library 108, 116, 122, 313
On Finance 3, 107, 314
On Extended Accommodations 116
On Publication. 107, 119, 313
On Hall 107, 108, 119
On the Publications of the Society 108, 309
On Dr. J. E. Humphrey's Paper 311, 313, 314
To Examine Paper of Prof. Cope 108, 111, 115
Congrès des Américanistes. 303
Internationale des Orientalistes, announcement of tenth session to be held. . . . 292
Géologique International, program of meetings to take place at Zurich in 1894 . . 292
Cope, Dr. E. D., presented additional matter for his paper in Transactions 121
Offers an amendment to Chapter ix, Section 1, of the Laws 117

Page.

Coues, Elliott, request for loan of Lewis and Clark Notebooks 315
Resolution in regard to 316
Curators' Report 262, 268, 309, 315
Deposits belonging to the Society, resolution in regard to 122, 268
Deutsche Anthropologische Gesellschaft, Wien, invitation from 292
Donations to the Cabinet 111, 257, 297, 304
Exchanges ordered 106, 255, 300, 310
Discontinued 313
Good Friday 256
Goodwin, Harold, letter from 314
Hart, C. H., letter from 292
Historical Society, Chicago, invitation from, to laying cornerstone of its new building 310
Hopkinson, Francis, portrait of 292, 309
Keating and Poinsett collections 315, 316
K. K. Geographische Gesellschaft, Vienna, letter from, discontinuing exchanges. . . 313
Leidy, Joseph, obituary of 135
Librarian, nominations for 3
Election of. 108
Locket containing hair of Gen. Andrew Jackson 111, 116
Monument to G. A. Hirn, Colmar, Alsace 256
To M. A. de Quatrefages 292
Morris, J. C., articles found by him in the Museum 3, 311
Minority Report 315
Naturforschende Gesellschaft des Osterlandes, Altenburg, invitation from 307
Nominations read 3, 108, 112, 122, 256, 262, 265, 300, 303, 305, 309, 311, 313, 314
Balloted for—Nos. 1232, 1233, 1234, 1235, 1236, 1237, 1238, 1239, 1240 116
Nos. 1233, 1241 265
Nos. 1242, 1248 314
Patterson, Robert, thanks tendered to 116
Peale stone-age relics returned to the American Philosophical Society 116
Phillips, Miss Emily, thanks of the Society tendered for gift of a locket containing hair of General Jackson 111, 116
Presented engraving of David Rittenhouse 257
Photographs received for the Society's album 1, 111, 257, 311
Photograph taken from portrait of Franklin 111
Phototype of Benjamin Franklin 297
Pickering, Edward C., letter from, in regard to a Southern telescope 303
Plaster medallions ordered framed 312
Poinsett and Keating collection 268
Public holiday. 307
Removal of books, MSS., etc., from storage rooms 256
Rothrock, J. T., fourteenth course of lectures, list of subjects 305
Royal Society of New South Wales offers a medal and £25 for best communication on various subjects 292
Sachse, Julius R., donation from 297
Sajous, Charles E., appointed delegate to Congrès des Américanistes to be held at Huelva, October, 1892 303
Sesqui-Centennial Anniversary 265
Specimens of early dentition from Spuj, Belgium, exhibited by Prof. Cope 119
Treasurer's Report 313
Truscott, Charles 111
University of Padua, circular from 307
Unveiling of the statue of Red Jacket, invitation to 292
Vaughan, Samuel, portrait of 292, 309

LIST OF SURVIVING MEMBERS

OF THE

AMERICAN PHILOSOPHICAL SOCIETY,

HELD AT PHILADELPHIA

FOR

PROMOTING USEFUL KNOWLEDGE.

Corrected to January 6, 1893,

BY

HENRY PHILLIPS, JR.,

A Secretary of the Society.

List of surviving Members of the American Philosophical Society, held at Philadelphia for Promoting Useful Knowledge.

The addresses here given so far as known are at the present time. Corrections of this list are respectfully solicited.

A name printed in *italics* indicates that the Society is uncertain as to whether such member is still living and desires information on the subject.

The Society will be happy to receive *photographs* (cabinet size preferred) of such of its members as have not already sent.

A

Name.	*Date of Election.*	*Present Address.*
1687. ABBÉ, CLEVELAND.	July 21, 1871,	Army Weather Bureau, Washington, D. C.
2170. ABBOTT, CHARLES C.	Dec. 20, 1889,	Bristol, Pa.
1463. ABBOT, HENRY L.	April 18, 1862,	New York city, N. Y.
1809. ÅCKERMAN, RICHARD	July 21, 1876,	Stockholm, Sweden.
1713. ACLAND, HENRY W.	Jan'y 17, 1873,	Oxford, England.
2128. ADAM, LUCIEN.	Dec. 17, 1886,	Rennes, France.
2081. ADAMS, H. B.	May 21, 1886,	Baltimore, Md.
1381. *Adamson, Rev. John C.*	July 13, 1856.	
1779. AGASSIZ, ALEXANDER	April 16, 1875,	Cambridge, Mass.
1642. AGASSIZ, ELIZABETH.	Oct. 15, 1869,	" "
2091. ALBRECHT, PAUL.	May 21, 1886,	Hamburg, Germany.
1860. ALISON, ROBERT H.	May 3, 1878,	Ardmore, Pa.
1869. ALLEN, JOEL ASAPH	Sept. 20, 1878,	New York, N. Y.
1776. ALLISON, JOSEPH.	April 16, 1875,	Philadelphia.
1927. AMES, CHARLES G.	Jan'y 21, 1881,	Boston, Mass.
2064. ANDERSON, GEORGE B.	Feb'y 19, 1886,	West Point, N. Y.
1655. ANDERSON, GEORGE W.	Oct. 15, 1869,	Rosemont, Pa.
2164. ANGELL, JAMES B.	Oct. 18, 1889,	Ann Arbor, Mich.
1122. *Angelis, Pedro de.*	Jan'y 17, 1840,	*Buenos Ayres, S. A.*
2102. ARGYLL, DUKE OF.	May 21, 1886,	London, England.
1761. ARMSTRONG, WM. GEORGE	July 17, 1874,	Newcastle-on-Tyne, England.
1996. ASHHURST, JOHN.	Jan'y 18, 1884,	Philadelphia.
2012. ASHHURST, RICHARD L.	April 18, 1884,	"

B

	Name.	Date of Election.	Present Address.
1995.	BACHE, R. MEADE	Jan'y 18, 1884,	Philadelphia.
1832.	BACHE, THOMAS HEWSON	Feb'y 2, 1877,	"
1630.	BAIRD, HENRY CAREY	Jan'y 15, 1869,	"
1991.	BAIRD, HENRY M.	Jan'y 18, 1884,	Yonkers, N. Y.
2075.	BAKER, WILLIAM S.	May 21, 1886,	Philadelphia.
2191.	BALL, ROBERT	May 15, 1891,	Dublin, Ireland.
1936.	BARBER, EDWIN ATLEE	April 15, 1881,	West Chester, Pa.
1818.	BARCENA, MARIANO	Feb'y 2, 1877,	Mexico.
1741.	BARKER, GEORGE F.	April 18, 1873,	Philadelphia.
2011.	BARKER, WHARTON	April 18, 1884,	"
2144.	BARNARD, WILLIAM T.	May 20, 1887,	Boonton, N. J.
1902.	BARTHOLOW, ROBERTS	April 16, 1880,	Philadelphia.
1133.	BARTLETT, W. H. C.	April 17, 1840,	Yonkers, N. Y.
2119.	BASTIAN, ADOLPH	Dec. 17, 1886,	Berlin, Germany.
1968.	BELL, ALEXANDER GRAHAM	July 21, 1882,	Washington.
1966.	BELL, JOSEPH SNOWDEN	July 21, 1882,	Philadelphia.
1802.	BELL, LOWTHIAN	April 21, 1876,	Newcastle-on-Tyne, England.
2149.	BIDDLE, ALEXANDER	Feb'y 17, 1888,	Philadelphia.
2154.	BIDDLE, ARTHUR	Dec. 21, 1888,	"
1920.	BIDDLE, CADWALADER	Oct. 15, 1880,	"
1831.	BIDDLE, CRAIG	Feb'y 2, 1877,	"
2134.	BILLINGS, JOHN S.	Feb'y 18, 1887,	Washington, D. C.
2157.	BLAIR, ANDREW A.	May 17, 1889,	Philadelphia.
1554.	*Blair, Thomas S.*	Jan'y 19, 1866,	*Pittsburgh, Pa.*
1669.	BLAKE, WILLIAM PHIPPS	Oct. 21, 1870,	New Haven, Conn.
1790.	BLASIUS, WILLIAM	Oct. 15, 1875,	Philadelphia.
1700.	BLODGET, LORIN	April 19, 1872,	"
1444.	BÖHTLINGK, OTTO	Jan'y 17, 1862,	Leipzig, Germany.
2047.	BONWILL, W. G. A.	Oct. 16, 1885,	Philadelphia.
1126.	BOYÉ, MARTIN H.	Jan'y 17, 1840,	Coopersburg, Pa.
1826.	BRACKETT, CYRUS FOGG	Feb'y 2, 1877,	Princeton, N. J.
2083.	BRANNER, JOHN C.	May 21, 1886,	Palo Alto, Cal.
2195.	BREZINA, ARISTIDES	May 21, 1886,	Vienna, Austria.
1636.	BRINTON, DANIEL G.	April 16, 1869,	Philadelphia.
2069.	BRINTON, JOHN H.	Feb'y 19, 1886,	"
1745.	BRITTON, J. BLODGETT	Oct. 17, 1873,	"
2080.	BROOKS, WILLIAM KEITH	May 21, 1886,	Baltimore, Md.
1881.	BROWN, ARTHUR ERWIN	April 18, 1879,	Philadelphia.
1333.	BROWN-SEQUARD, E.	Jan'y 20, 1854,	Paris, France.
1614.	BRUGSH, HENRI	Jan'y 15, 1869,	Berlin, Prussia.
1547.	BRUSH, GEORGE J.	Jan'y 20, 1865,	New Haven, Conn.
1653.	BULLOCK, CHARLES	Oct. 15, 1869,	Philadelphia.
1452.	BUNSEN, ROBERT W.	Jan'y 17, 1862,	Heidelberg, Germany.
2008.	BURK, ISAAC	Jan'y 18, 1884,	Philadelphia.
2007.	BURK, JESSE Y.	Jan'y 18, 1884,	"
1938.	BUTLER, WILLIAM	April 15, 1881,	West Chester, Pa.

C

1788.	CAMPBELL, JOHN LYLE	July 16, 1875,	Crawfordsville, Ind.
1606.	CANBY, WILLIAM MARRIATT	Oct. 16, 1868,	Wilmington, Del.
2051.	CANNIZZARO, TOMMASO	Oct. 16, 1885,	Messina, Italy.
1731.	CAPELLINI, GIOVANNI	April 18, 1873,	Bologna, Italy.
1796.	CARLL, J. F.	Oct. 15, 1875,	Pleasantville, Pa.
2130.	CARRILLO, CRESCENCIO	Dec. 17, 1886,	Merida, Yucatan.

	Name.	*Date of Election.*	*Present Address.*
1911.	CARSON, HAMPTON L.	April 16, 1880,	Philadelphia.
1707.	CASSATT, ALEXANDER JOHNSON	Oct. 18, 1872,	"
2147.	CASTNER, SAMUEL, JR.	Dec. 16, 1887,	"
2152.	CATTELL, J. MCKEEN	May 18, 1888,	New York, N. Y.
1675.	CATTELL, WILLIAM C.	Jan'y 20, 1871,	Philadelphia.
1908.	CHANCE, HENRY MARTYN	April 16, 1880,	"
1783.	CHANDLER, C. F.	April 16, 1875,	New York, N. Y.
1778.	CHAPMAN, HENRY C.	April 16, 1875,	Philadelphia.
2132.	CHARENCEY, COMTE HYACINTH DE	Dec. 17, 1886,	St. Maurice les Charencey, France.
2111.	CHILDS, GEORGE W.	Dec. 17, 1886,	Philadelphia.
2158.	CLARK, CLARENCE H.	May 17, 1889,	"
1717.	CLARKE, THOMAS C.	Jan'y 17, 1873,	New York, N. Y.
1983.	CLAYPOLE, E. W.	Jan'y 19, 1883,	Akron, Ohio.
2048.	CLEEMANN, T. M.	Oct. 16, 1885,	Philadelphia.
1876.	CLOISEAUX, DES, A.	Oct. 18, 1879,	Paris, France.
1999.	COHEN, J. SOLIS	Jan'y 18, 1884,	Philadelphia.
2005.	COLERIDGE, LORD	Jan'y 18, 1884,	London, England.
1555.	COPE, EDWARD D.	Jan'y 19, 1866,	Philadelphia.
1367.	COPPÈE, HENRY	Jan'y 18, 1856,	Bethlehem, Pa.
2129.	CORA, GUIDO	Dec. 17, 1886,	Turin, Italy.
1474.	CORNELIUS, ROBERT	Oct. 17, 1862,	Philadelphia.
1867.	COUES, ELLIOTT	Sept. 20, 1878,	Washington, D. C.
1662.	COX, J. D.	April 15, 1870,	Cincinnati, O.
1672.	COXE, ECKLEY B.	Oct. 21, 1870,	Drifton, Pa.
2207.	CHARLES H. CRAMP	Dec. 16, 1892,	Philadelphia.
1836.	CRANE, THOMAS F.	Feb'y 2, 1877,	Ithaca, N. Y.
1393.	CRESSON, CHARLES M.	April 17, 1857,	Philadelphia.
2100.	CROOKES, WILLIAM	May 21, 1886,	London, England.
2172.	CRUZ, FERNANDO (of Guatemala)	Dec. 20, 1889.	
1439.	CURWEN, JOHN	April 18, 1861,	Warren, Pa.

D

1567.	DA COSTA, J. M.	Oct. 19, 1866,	Philadelphia.
1354.	DANA, JAMES D	July 21, 1854,	New Haven, Conn.
1806.	DANNEFELD, C. JUHLIN	April 21, 1876,	Stockholm, Sweden.
1516.	DAUBRÉE, A.	July 17, 1863,	Paris, France.
1811.	DAVENPORT, SAMUEL	Oct. 20, 1876,	Adelaide, S. Australia.
1557.	DAVIDSON, GEORGE	Jan'y 19, 1866,	San Francisco, Cal.
1923.	DAWKINS, WILLIAM B	Oct. 15, 1880,	Manchester, England.
1468.	DAWSON, JOHN W	April 18, 1862,	Montreal, Canada.
2131.	DELGADO, JUAN DE DIAS DE LA RADA Y.	Dec. 17, 1886,	Madrid, Spain.
2013.	DICKSON, SAMUEL	April 18, 1884,	Philadelphia.
2208.	DIXON, SAMUEL G.	Dec. 16, 1892,	"
2108.	DOLLEY, CHARLES S.	Dec. 17, 1886,	"
2089.	DONNER, OTTO.	May 21, 1886,	Helsingfors, Finland.
1946.	DOOLITTLE, C. L.	Oct. 21, 1881,	Bethlehem, Pa.
1839.	DOUGLASS, JAMES, JR.	April 20, 1877,	Spuytenduyvil, N. Y.
1924.	DRAPER, DANIEL	Oct. 15, 1880,	New York, N. Y.
2200.	DREXEL, A. J.	Feb'y 19, 1892,	Philadelphia.
1787.	DROWN, THOMAS M	July 16, 1875,	Boston, Mass.
1918.	DU BOIS, PATTERSON	Oct. 15, 1880,	Philadelphia.
1878.	DUDLEY, CHARLES BENJAMIN	Jan'y 17, 1879,	Altoona, Pa.
1921.	DUDLEY, THOMAS H	Oct. 15, 1880,	Camden, N. J.
2063.	DUNCAN, LOUIS	Feb'y 19, 1886,	U. S. Navy.

Name.	*Date of Election.*	*Present Address.*
2208. DERCUM, FRANCIS X.	Dec. 16, 1892,	Philadelphia.

	Name.	*Date of Election.*	*Present Address.*
1573.	DUNNING, GEORGE F.	Jan'y 18, 1867,	Farmington, Conn.
1727.	DUPONT, EDOUARD	April 18, 1873,	Brussels, Belgium.
2086.	DURUY, VICTOR	May 21, 1886,	Paris, France.
1679.	DUTTON, CLARENCE E	Jan'y 20, 1871,	Washington, D. C.

E

2105.	EASTON, MORTON W.	Dec. 17, 1886,	Philadelphia.
1917.	ECKFELDT, JACOB B	Oct. 15, 1880,	"
1825.	EDDY, HENRY T.	Feb'y 2, 1877,	Terre Haute, Ind.
1686.	ELIOT, CHARLES W.	April 21, 1871,	Cambridge, Mass.
1981.	EMMONS, S. F.	Jan'y 19, 1883,	Washington, D. C.
1943.	EVANS, JOHN	Oct. 21, 1881,	Hemel Hempstead, Eng.

F

2180.	FIELD, ROBERT PATTERSON	May 16, 1890,	Philadelphia.
1901.	FLINT, AUSTIN, JR	April 16, 1880,	New York, N. Y.
1621.	FLOWER, WM. HENRY.	Jan'y 15, 1869,	London, England.
1875.	FOGGO, EDWARD A.	Oct. 18, 1879,	Philadelphia.
2197.	FORBES, GEORGE	Oct. 16, 1891,	London, England.
1170.	FRALEY, FREDERICK	July 15, 1842,	Philadelphia.
1912.	FRALEY, JOSEPH C.	April 16, 1880,	"
1695.	FRAZER, PERSIFOR	Jan'y 19, 1872,	"
2171.	FRIEBIS, GEORGE	Dec. 20, 1889,	"
1459.	FROUDE, J. A.	Jan'y 17, 1862,	London, England.
2179.	FULLERTON, GEORGE S.	May 16, 1890,	Philadelphia.
1739.	FULTON, JOHN.	April 18, 1873,	Johnstown, Pa.
1914.	FURNESS, HORACE HOWARD	April 16, 1880,	Philadelphia.
1130.	FURNESS, WILLIAM H.	April 17, 1840,	"

G

1988.	GARRETT, PHILIP C	April 20, 1883,	Philadelphia.
2079.	GATES, M. E	May 21, 1886,	Amherst, Mass.
1025.	GATSCHET, ALBERT S.	Oct. 17, 1884,	Washington, D. C.
1897.	GEIKIE, ARCHIBALD	Jan'y 16, 1880,	London, England.
1803.	GEIKIE, JAMES.	April 21, 1876,	Edinburgh, Scotland.
1339.	GENTH, FRED. AUGUSTUS.	Jan'y 20, 1854,	Philadelphia.
2067.	GENTH, F. A., JR.	Feb'y 19, 1886,	"
1355.	GIBBS, OLIVER WOLCOTT.	July 21, 1854,	Cambridge, Mass.
1587.	GILL, THEODORE NICHOLAS	July 19, 1867,	Washington, D. C.
1800.	GILMAN, DANIEL C.	April 21, 1876,	Baltimore, Md.
1940.	*Giraldes, J. P. C. Cassado de.*	July 20, 1827.	
1950.	GLADSTONE, WM. EWART	Oct. 21, 1881,	London, England.
2162.	GOODE, G. BROWN	Oct. 18, 1889,	Washington, D. C.
1835.	GOODELL, WILLIAM	Feb'y 2, 1877,	Philadelphia.
1680.	GOODFELLOW, EDWARD.	Jan'y 20, 1871,	Washington, D. C.
2203.	GOODWIN, HAROLD	May 20, 1892,	Philadelphia.
1271.	GOULD, BEN. APTHORPE	Jan'y 17, 1851,	Cambridge, Mass.
1851.	GRAY, ELISHA.	Jan'y 18, 1878,	Chicago, Ill.
1605.	GREEN, TRAILL	Oct. 16, 1868,	Easton, Pa.
1504.	GREEN, WILLIAM HENRY	April 17, 1863,	Princeton, N. J.
1880.	GREENE, WILLIAM H.	April 18, 1879,	Philadelphia.
2155.	GREGORIO, IL MARCHESE ANTONIO DE	Dec. 21, 1888,	Palermo, Italy.

	Name.	*Date of Election.*	*Present Address.*
2159.	GREGORY, HENRY D.	May 17, 1889,	Philadelphia.
2188.	GREGORY, CASPAR RÉNÉ.	May 15, 1891,	Leipzig.
1229.	*Grimaldi, Ceva*	Oct. 16, 1846,	*Naples, Italy.*
1939.	GRISCOM, WM. WOODNUTT . . .	April 15, 1881,	Haverford, Pa.
1815.	GROTE, AUGUSTUS RADCLIFFE . .	Oct. 20, 1876.	
2090.	GUBERNATIS, ANGELO DE	May 21, 1886,	Florence, Italy.
1438.	*Guyangos, Puscual de.*	April 19, 1861,	*Madrid, Spain.*

H

2054.	HAECKEL, ERNEST.	Oct. 16, 1885,	Jena, Prussia.
2066.	HAGEN, H. A.	Feb'y 19, 1886,	Cambridge, Mass.
1658.	HALE, EDW. EVERETT	Jan'y 21, 1870,	Roxbury, Mass.
1709.	HALE, HORATIO	Oct. 18, 1872,	Clinton, Canada.
1853.	HALL, ASAPH	Jan'y 18, 1878,	Washington, D. C.
1795.	HALL, CHARLES EDWARD	Oct. 15, 1875,	Westport, N. Y.
1356.	HALL, JAMES	July 21, 1854,	Albany, N. Y.
2027.	HALL, LYMAN B	Jan'y 16, 1885,	Haverford, Pa.
1412.	HAMMOND, WILLIAM A	Oct. 21, 1859,	New York, N. Y.
2194.	HAMY, E. T.	May 15. 1891,	Paris, France.
1337.	HARDING, GEORGE	Jan'y 20, 1854,	Philadelphia.
2136.	HARRIS, JOSEPH S.	May 20, 1887,	"
1827.	HART, JAMES MORGAN.	Feb'y 2, 1877,	Ithaca, N. Y.
1510.	HARTSHORNE, HENRY.	July 17, 1863,	Philadelphia.
1764.	HAUER, FRANZ RITTER VON. .	Oct. 16, 1874,	Vienna, Austria.
1681.	HAUPT, HERMANN.	April 21, 1871,	St. Paul, Minn.
1862.	HAUPT, LEWIS M.	May 3, 1878,	Philadelphia.
2082.	HAYES, R. SOMERS.	May 21, 1886,	New York, N. Y.
2071.	HAYS, J. MINIS	Feb'y 19, 1886,	Philadelphia.
2165.	HAZLEHURST, HENRY	Oct. 18, 1889,	"
1985.	HEILPRIN, ANGELO	April 20, 1883,	"
1734.	HELMHOLTZ, HEINRICH	April 18, 1873,	Berlin, Prussia.
1963.	HILL, HAMILTON ANDREWS . . .	April 21, 1882,	Boston, Mass.
2110.	HILPRECHT, HERMANN V.	Dec. 17, 1886,	Philadelphia.
1768.	HIMES, CHARLES FRANCIS . . .	Oct. 16, 1874,	Carlisle, Pa.
1663.	HITCHCOCK, CHARLES HENRY . .	April 15, 1870,	Hanover, N. H.
2160.	HOFFMAN, WALTER J.	Oct. 18, 1889,	Washington, D. C.
2068.	HOLLAND, JAMES W.	Feb'y 19, 1886,	Philadelphia.
1898.	HOLMES, OLIVER WENDELL . . .	Jan'y 16, 1880,	Boston, Mass.
1624.	HOOKER, JOSEPH D.	Jan'y 15, 1869,	London, England.
1652.	HOPPER, EDWARD	Oct. 15, 1869,	Philadelphia.
1607.	HORN, GEORGE HENRY	Oct. 16, 1868,	"
2070.	HORNER, INMAN.	Feb'y 19, 1886,	"
1941.	HOTCHKISS, JEDEDIAH.	Oct. 21, 1881,	Staunton, Va.
1696.	HOUGH, GEORGE W.	Jan'y 19, 1872,	Chicago, Ill.
1698.	HOUSTON, EDWIN J.	Jan'y 19, 1872,	Philadelphia.
2143.	HOUSTON, HENRY H	May 20, 1887,	"
2084.	HOVELACQUE, ABEL	May 21, 1886,	Paris, France.
1843.	HUMPHREY, H. C	July 20, 1877,	
2211.	HUMPHREY, JAMES ELLIS	Dec. 16, 1892,	Amherst, Mass.
1623.	HUXLEY, THOMAS HENRY	Jan'y 15, 1869,	London, England.
1426.	HYRTL, JOSEPH	July 20, 1860,	Vienna, Austria.

I

2052.	IM THURN, EVERARD F.	Oct. 16, 1885,	Georgetown, British Guiana.
1773.	INGHAM, WM. ARMSTRONG. . . .	April 16, 1875,	Philadelphia.

J

	Name.	Date of Election.	Present Address.
2010.	James, Edmund J	April 18, 1884,	Philadelphia.
1933.	Jannet, Claudio	April 15, 1881,	Paris, France.
2049.	Jayne, Horace	Oct. 16, 1885,	Philadelphia.
1954.	Jefferis, William W	Jan'y 20, 1882,	"
1942.	Jones, Charles C., Jr.	Oct. 21, 1881,	Augusta, Ga.
2017.	Jordan, Francis, Jr.	April 18, 1884,	Philadelphia.

K

1989.	Kane, Elisha Kent.	April 20, 1883,	Kane, Pa.
2169.	Keane, John J.	Dec. 20, 1889,	Washington, D. C.
1348.	Keating, William V	April 21, 1854,	Philadelphia.
2021.	Keen, William W.	July 18, 1884,	"
1962.	Keim, Geo. de Benneville.	April 21, 1882,	"
2118.	Kiepert, Henri.	Dec. 17, 1886,	Berlin, Prussia.
1161.	Kendall, E. Otis	Jan'y 21, 1842,	Philadelphia.
1708.	King, Clarence	Oct. 18, 1872,	New York, N. Y.
1284.	Kirkwood, Daniel	April 18, 1851,	Riverside, Cal.
1767.	König, George A	Oct. 16, 1874,	Houghton, Mich.
2167.	Krauss, Friederich S	Dec. 20, 1889,	Vienna, Austria.

L

1026.	*Labouderie, J.*	April 19, 1833,	*Paris, France.*
1694.	Lambert, Guillaume.	Jan'y 19, 1872,	Louvain, Belgium.
1858.	Landreth, Burnet.	Jan'y 18, 1878,	Bristol, Pa.
1781.	Langley, Samuel P.	April 16, 1875,	Washington, D. C.
1721.	La Roche, C. Percy	Jan'y 17, 1873,	Rome, Italy.
1711.	Lauth, Franz Joseph	Oct. 18, 1872,	Munich, Bavaria.
1974.	Lawes, John Bennett	Jan'y 19, 1883,	Rothamstead, Herts, Eng.
1595.	Lea, Henry Charles.	Oct. 18, 1867,	Philadelphia.
1737.	Le Conte, Joseph.	April 18, 1873,	Berkeley, Cal.
2125.	Leemans, Conrad.	Dec. 17, 1886,	Leyden, Holland.
1986.	Lehman, Ambrose E.	April 20, 1883,	Philadelphia.
2182.	Leland, Charles G.	May 16, 1890,	London, Eng.
2174.	Le Moine, J. M.	Dec. 20, 1889,	Quebec, Canada.
1934.	Le Roy-Beaulieu, Paul.	April 15, 1881,	Paris, France.
1382.	Lesley, J. Peter	July 13, 1856,	Philadelphia.
1376.	Letchworth, Albert S.	Jan'y 18, 1856,	"
2085.	Levasseur, Emile.	May 21, 1886,	Paris, France.
1415.	Lewis, Francis W.	Jan'y 20, 1860,	Philadelphia.
1383.	*Leyburn, John.*	July 13, 1856,	*Baltimore, Md.*
1756.	Lockyer, Joseph Norman.	April 17, 1874,	London, England.
2202.	Low, Seth	Feb. 19, 1892,	New York, N. Y.
1872.	Longstreth, Morris	Sept. 20, 1878,	Philadelphia.
1015.	*Lorin, Theodore*	April 20, 1832,	*Paris, France.*
2019.	Lubbock, John	July 18, 1884,	London, England.
2003.	Ludlow, William.	Jan'y 18, 1884,	U. S. A.
1629.	Lyman, Benjamin Smith	Jan'y 15, 1869,	Philadelphia.

M

1058.	*Macedo, J. L. DaCosta*	April 15, 1836,	*Lisbon, Portugal.*
2209.	Macfarlane, John M.	Dec. 16, 1892,	Lansdowne, Pa.
1994.	Maisch, John M.	Jan'y 18, 1884,	Philadelphia.
1970.	Mallery, Garrick, Jr	Oct. 20, 1882,	Washington, D. C.
2042.	Mallet, John Wm.	Jan'y 16, 1885,	University of Virginia, Va

	Name.	*Date of Election.*	*Present Address.*
1847.	MANSFIELD, IRA FRANKLIN . . .	Jan'y 18, 1878,	Cannelton, Pa.
1857.	MARCH, FRANCIS ANDREW . . .	Jan'y 18, 1878,	Easton, Pa.
1861.	MARKS, WILLIAM D	May 3, 1878,	Philadelphia.
1604.	MARSH, OTHNIEL C	Oct. 16, 1868,	New Haven, Conn.
2078.	MARSHALL, JOHN	May 21, 1886,	Philadelphia.
1018.	*Martinez, Juan José*	April 20, 1832,	*Spain.*
2184.	MASCART, E.	Dec. 19, 1890,	Paris, France.
1572.	MASON, ANDREW	Jan'y 18, 1867,	New York, N. Y.
2196.	MASPERO, GASTON	May 15, 1891,	Paris, France.
1654.	MAYER, ALFRED M	Oct. 15, 1869,	Hoboken, N. J.
2107.	MCALISTER, JAMES	Dec. 17, 1886,	Philadelphia.
1928.	MCCAULEY, EDWARD Y	Jan'y 21, 1881,	"
1685.	MCCOSH, JAMES	April 21, 1871.	
1888.	MCCREATH, ANDREW S.	July 18, 1879,	Harrisburg, Pa.
1821.	MCKEAN, WILLIAM V.	Feb'y 2, 1877,	Philadelphia.
2004.	MCMASTER, JOHN BACH	Jan'y 18, 1884,	"
1677.	MEEHAN, THOMAS	Jan'y 20, 1871,	"
1903.	MERRICK, JOHN VAUGHAN . . .	April 16, 1880,	"
1947.	MERRIMAN, MANSFIELD	Oct. 21, 1881,	Bethlehem, Pa.
1744.	MESSCHERT, MATHEW HUIZINGA.	Oct. 17, 1873,	Douglassville, Pa.
2142.	MICHAEL, HELEN ABBOTT. . . .	May 20, 1887,	Philadelphia.
2175.	MITCHELL, JAMES T.	Feb'y 21, 1890,	"
1461.	MITCHELL, S. WEIR	Jan'y 17, 1862,	"
2114.	MONIER-WILLIAMS, MONIER . . .	Dec. 17, 1886,	London, England.
1791.	MOORE, GIDEON E	Oct. 15, 1875,	New York, N. Y.
2029.	MOORE, JAMES W	Jan'y 16, 1885,	Easton, Pa.
1841.	MOREHOUSE, GEORGE R	April 20, 1877,	Philadelphia.
1054.	*Morelli.*	Jan'y 15, 1836,	*Naples, Italy.*
1976.	MORRIS, J. CHESTON.	Jan'y 19, 1883,	Philadelphia.
1577.	MORTON, HENRY	Jan'y 18, 1867,	Hoboken, N. J.
2121.	MUCH, MATTHÆUS.	Dec. 17, 1886,	Vienna, Austria.
1866.	MÜHLENBERG, F. A.	Sept. 20, 1878,	Greenville, Pa.
2120.	MUELLER, FRIEDERICH	Dec. 17, 1886,	Vienna, Austria.
1486.	MUELLER, F. MAX.	Jan'y 16, 1863,	Oxford, England.
2192.	MUNROE, CHARLES E.	May 15, 1891,	Washington, D. C.
1892.	MUONI, DAMIANO	Jan'y 16, 1880,	Milan, Italy.
2062.	MURDOCK, J. B.	Feb'y 19, 1886,	U. S. Navy.
1937.	MURRAY, JAMES A. H.	April 15, 1881,	Oxford, England.

N

2087.	NADAILLAC, MARQUIS DE.	May 21, 1886,	Paris, France.
1852.	NEWCOMB, SIMON	Jan'y 18, 1878,	Washington, D. C.
1582.	NEWTON, HUBERT ANSON	April 19, 1869,	New Haven, Conn.
1703.	NICHOLS, STARR HOYT	July 19, 1872,	New York, N. Y.
2060.	NIKITIN, SERGE	Feb'y 19, 1866,	St. Petersburg, Russia.
1805.	NORDENSKIÖLD, ADOLF ERIC . .	April 21, 1876,	Stockholm, Sweden.
1712.	NORRIS, ISAAC.	Oct. 18, 1872,	Philadelphia.
2106.	NORRIS, WILLIAM F.	Dec. 17, 1886,	"
2046.	NORTH, EDWARD.	Oct. 16, 1885,	Clinton, N. Y.

O

2072.	OLIVER, CHARLES A.	Feb'y 19, 1886,	Philadelphia.
1715.	OLIVER, JAMES E.	Jan'y 17, 1873,	Ithaca, N. Y.
2195.	OPPERT, JULES.	May 15, 1891,	Paris, France.
2135.	OSBORN, HENRY F.	Feb'y 18, 1887,	Princeton, N. J.
1581.	OSBORN, HENRY S.	Jan'y 18, 1867,	Oxford, O.
2039.	OSLER, WILLIAM	Jan'y 16, 1885,	Baltimore, Md.
1801.	OWEN, P. CUNLIFFE	April 21, 1876,	London, England.

P

	Name.	*Date of Election.*	*Present Address.*
1868.	PACKARD, A. S., JR.	Sept. 20, 1878,	Providence, R. I.
1578.	PACKARD, JOHN H.	Jan'y 18, 1867,	Philadelphia.
1331.	PAGET, JAMES	Jan'y 20, 1854,	London, England.
1984.	PANCOAST, WILLIAM HENRY	Jan'y 19, 1883,	Philadelphia.
1673.	PARIEU, ESQUIRON DE	Jan'y 20, 1871,	Paris, France.
2036.	PARVIN, THEOPHILUS	Jan'y 16, 1885,	Philadelphia.
2056.	PASTEUR, LOUIS	Oct. 16, 1885,	Paris, France.
2035.	PATTERSON, C. STUART	Jan'y 16, 1885,	Philadelphia.
1282.	PATTERSON, ROBERT	April 18, 1851,	"
1320.	PATTERSON, THOMAS L.	April 15, 1853,	Cumberland, Md.
1772.	PEARSE, JOHN B.	Jan'y 15, 1875.	*Boston, Mass.*
1859.	PEIRCE, C. NEWLIN	May 3, 1878,	Philadelphia.
1722.	PEMBERTON, HENRY	Jan'y 17, 1873,	"
2104.	PEÑAFIEL, ANTONIO	May 21, 1886,	Mexico.
2073.	PENNYPACKER, SAMUEL W.	May 21, 1886,	Philadelphia.
1518.	PENROSE, R. A. F.	July 17, 1863,	"
2059.	PEPPER, EDWARD	Feb'y 19, 1886,	Paris.
1666.	PEPPER, WILLIAM	July 15, 1870,	Philadelphia.
951.	*Pereira, José Maria Dantes*	April 18, 1828,	*Lisbon, Portugal.*
1705.	PETER, ROBERT	July 19, 1872,	Lexington, Ky.
1824.	PHILLIPS, HENRY, JR.	Feb'y 2, 1877,	Philadelphia.
1760.	PLATT, FRANKLIN	July 17, 1874,	"
2127.	PLATZMAN, JULIUS	Dec. 17, 1886,	Leipzig, Germany.
2053.	POMIALOWSKY, JOHN	Oct. 16, 1885,	St. Petersburg, Russia.
1539.	PORTER, THOMAS CONRAD	Oct. 21, 1864,	Easton, Pa.
2203.	POTTS, JOSEPH D.	May 20, 1892,	Philadelphia.
2044.	POTTS, WILLIAM JOHN	Oct. 16, 1885,	Camden, N. J.
2097.	POSTGATE, J. P	May 21, 1886,	Cambridge, England.
2161.	POWELL, J. W.	Oct. 18, 1889,	Washington, D. C.
1619.	PRESTWICH, JOSEPH	Jan'y 15, 1869,	Shoreham, England.
1592.	PRICE, J. SERGEANT	Oct. 18, 1867.	Philadelphia.
1780.	PRIME, FREDERICK, JR	April 16, 1875,	"
2088.	PULZSKY, FRANCIS	May 21, 1886,	Buda-Pesth, Hungary.
1758.	PUMPELLY, RAPHAEL	April 17, 1874,	Newport, R. I.

Q

973.	*Quadrada, Francisco de Paolo*	Oct. 16, 1829,	*Madrid, Spain.*
1143.	*Quaranta, Barnardo.*	Jan'y 15, 1841,	*Naples, Italy.*

R

1736.	RAND, THEODORE D.	April 18, 1873,	Philadelphia.
1849.	RANDALL, F. A.	Jan'y 18, 1878,	Warren, Pa.
1644.	RAWLINSON, GEORGE.	Oct. 15, 1869,	Oxford, England.
1765.	RAWSON, RAWSON W	Oct. 16, 1874,	London, "
2099.	RAYLEIGH, LORD	May 21, 1886,	Essex, England.
1784.	RAYMOND, ROSSITTER W	April 16, 1875,	New York, N. Y.
1585.	RAYNOLDS, WILLIAM F.	April 19, 1867,	Detroit, Mich.
1591.	READ, JOHN MEREDITH	July 19, 1867.	
2077.	REED, HENRY	May 21, 1886,	Philadelphia.
1889.	REMSEN, IRA	July 18, 1879,	Baltimore, Md.
1948.	RENARD, A	Oct. 21, 1881,	Brussels, Belgium.
1343.	RENARD, CHARLES	Jan'y 20, 1854,	Moscow, Russia.
1890.	RENEVIER, E.	July 18, 1879,	Lausanne, Switzerland.

	Name.	*Date of Election.*	*Present Address.*
1816.	REULEAUX, F.	Feb'y 2, 1877,	Berlin, Prussia.
2122.	RÉVILLE, ALBERT	Dec. 17, 1886,	Paris, France.
1500.	RICHARDSON, BEN. WARD	April 17, 1863,	London, England.
1808.	RILEY, CHARLES V	April 21, 1876,	Washington, D. C.
1957.	ROBINS, JAMES W	April 21, 1882,	Philadelphia.
1390.	ROGERS, FAIRMAN.	Jan'y 16, 1857,	Newport, R. I.
2177.	ROGERS, ROBERT W	Feb'y 21, 1890,	Carlisle, Pa.
1906.	ROGERS, WILLIAM B., JR	April 16, 1880,	Philadelphia.
1462.	RÖHRIG, F. L. O.	April 18, 1862,	Los Angeles, Cal.
2050.	ROLLETT, HERMANN	Oct. 16, 1885,	Vienna, Austria.
1907.	ROOD, OGDEN N	April 16, 1880,	New York, N. Y.
1964.	ROSNY, DE, LÉON	July 21, 1882,	Paris, France.
1732.	ROSSI, GIOVANNI BATTISTA. . . .	April 18, 1873,	Rome, Italy.
2198.	ROSENGARTEN, JOSEPH G.	Oct. 16, 1891,	Philadelphia.
1718.	ROTHERMEL, PETER F.	Jan'y 17, 1873,	Limerick P. O., Pa.
1838.	ROTHROCK, JOSEPH T	April 20, 1877,	Philadelphia.
1264.	RUSCHENBERGER, WM. S. W. . . .	Oct. 19, 1849,	"
1620.	RUTIMEYER, CARL L.	Jan'y 15, 1869,	Basel, Switzerland.
2109.	RYDER, JOHN A	Dec. 17, 1886,	Philadelphia.

S

1766.	SADTLER, SAMUEL PHILIP	Oct. 16, 1874,	Philadelphia.
2148.	SAJOUS, CHARLES E.	Feb'y 17, 1888,	Paris, France.
1563.	SANDBERGER, FRIDOLIN	April 20, 1866,	Würtzburg, Bavaria.
1958.	SARGENT, CHARLES SPRAGUE . .	April 21, 1882,	Brookline, Mass.
1730.	SAUSSURE, HENRI DE.	April 18, 1873,	Geneva, Switzerland.
1877.	SCHORLEMMER, C.	Oct. 18, 1878,	Manchester, England.
1498.	SCHOTT, CHARLES ANTHONY . . .	April 17, 1863,	Washington, D. C.
1864.	SCHURZ, CARL	Sept. 20, 1878.	
1725.	SCLATER, PHILLIP LUTLEY. . . .	April 18, 1873,	London, England.
1919.	SCOTT, LEWIS A.	Oct. 15, 1880,	Philadelphia.
2112.	SCOTT, W. B.	Dec. 17, 1886,	Princeton, N. J.
1870.	SCUDDER, SAMUEL HUBBARD. . .	Sept. 20, 1878,	Cambridge, Mass.
1656.	SEIDENSTICKER, OSWALD	Jan'y 21, 1870,	Philadelphia.
1883.	SEILER, CARL	April 18, 1879,	"
1704.	SELLERS, COLEMAN	July 19, 1872,	"
1533.	SELLERS, WILLIAM.	April 15, 1864,	"
1770.	SELWYN, ALFRED R. C.	Oct. 16, 1874,	Montreal, Canada.
1728.	SELYS, DE, LONGCHAMPS.	April 18, 1873,	Liége, Belgium.
2057.	SERGI, GIUSEPPE	Oct. 16, 1885,	Rome, Italy.
1965.	SÈVE DE BAR, EDOUARD	July 21, 1882,	Ramsgate, England.
2076.	SHARP, BENJAMIN.	May 21, 1886,	Philadelphia.
1944.	SHARPLES, PHILIP PRICE	Oct. 21, 1881,	West Chester, Pa.
1960.	SHARPLES, STEPHEN PASCHALL. .	April 21, 1882,	Boston, Mass.
2002.	SHARPLESS, ISAAC	Jan'y 18, 1884,	Haverford, Pa.
1792.	SHEPPARD, FURMAN.	Oct. 15, 1875,	Philadelphia.
1797.	SHERWOOD, ANDREW	Oct. 15, 1875,	Mansfield, Pa.
1822.	SHIELDS, CHARLES W.	Feb'y 2, 1877,	Princeton, N. J.
1532.	*Shinz, Carl*.	April 15, 1864,	*Strasburg, Germany*. (?)
2146.	SMITH, EDGAR F.	Oct. 21, 1887,	Philadelphia.
1544.	SMITH, GOLDWIN.	Jan'y 20, 1865.	
1789.	SMITH, STEPHEN	Oct. 15, 1875,	New York, N. Y.
2141.	SMYTH, ALBERT H.	May 20, 1887,	Philadelphia.
1742.	SNOWDEN, A. LOUDON	Oct. 17, 1873,	"
2009.	SNYDER, MONROE B..	Jan'y 18, 1884,	"
2189.	SPANGLER, HENRY W	May 15, 1891,	"

	Name.	*Date of Election.*	*Present Address.*
1720.	SPOFFORD, A. R.	Jan'y 17, 1873,	Washington, D. C.
1949.	STALLO, JOHN B.	Oct. 21, 1881,	Cincinnati, O.
1446.	STEENSTRUP, J. J. S.	Jan'y 17, 1862,	Copenhagen, Denmark.
1990.	STEVENS, WALTER LECONTE	Jan'y 18, 1884,	Troy, N. Y.
1840.	STEVENSON, JOHN JAMES	April 20, 1877,	New York, N. Y.
2168.	STOKES, GEORGE G.	Dec. 20, 1889,	London, England.
1834.	STRAWBRIDGE, GEORGE	Feb'y 2, 1877,	Philadelphia.
1559.	STRONG, WILLIAM	Jan'y 19, 1866,	Washington, D. C.
1820.	STUART, GEORGE	Feb'y 2, 1877,	Philadelphia.
2193.	STUBBS, WILLIAM	May 15, 1891,	Oxford, England.
2093.	STUER, DIONYS	May 21, 1886,	Vienna, Austria.
2094.	SUESS, EDWARD	May 21, 1886,	" "
2023.	SYLE, E. W.	July 18, 1884,	Philadelphia.
1844.	SYLVESTER, J. J.	July 20, 1877,	Oxford, England.
2092.	SZOMBATHY, JOSEF	May 21, 1886,	Vienna, Austria.
	T		
1786.	TATHAM, WILLIAM P.	April 16, 1875,	Philadelphia.
1846.	TAYLOR, WILLIAM B.	Oct. 19, 1877,	Washington, D. C.
2098.	TEMPLE, RICHARD CARNAC	May 21, 1886,	Upper Burmah, India.
2006.	THOMAS, ALLEN C.	Jan'y 18, 1884,	Haverford, Pa.
1807.	THOMSON, ELIHU	April 21, 1876,	Swampscott, Mass.
1993.	THOMPSON, HEBER S.	Jan'y 18, 1884,	Pottsville, Pa.
1726.	THOMPSON, HENRY.	April 18, 1873,	London, England.
1755.	THOMPSON, ROBERT ELLIS	April 17, 1874,	Philadelphia.
1754.	THOMSON, FRANK	April 17, 1874,	"
1723.	THOMSON, WILLIAM	April 18, 1873,	London, England.
1909.	THOMSON, WILLIAM	April 16, 1880,	Philadelphia.
1530.	THURY, A.	April 15, 1864,	Geneva, Switzerland.
1688.	TILGHMAN, BENJAMIN C	July 21, 1871,	Philadelphia.
1233.	TILGHMAN, RICHARD A	April 16, 1847,	"
1657.	TILGHMAN, WILLIAM M.	Jan'y 21, 1870,	"
2176.	TIMMINS, SAMUEL	Feb. 21, 1890,	Arley, near Coventry, Eng.
2123.	TOPINARD, PAUL.	Dec. 17, 1886,	Paris, France.
2065.	TOPPAN, ROBERT NOXON.	Feb'y 19, 1886,	Cambridge, Mass.
1597.	TOWNSEND, JOSEPH B	Jan'y 17, 1868,	Philadelphia.
1955.	TOWNSEND, WASHINGTON	Jan'y 20, 1882,	West Chester, Pa.
1691.	TROWBRIDGE, WILLIAM P	Jan'y 19, 1872,	New York, N. Y.
2024.	TRUMBULL, HENRY CLAY	July 18, 1884,	Philadelphia.
1973.	TSCHERMAK, GUSTAF	Oct. 20, 1882,	Vienna, Austria.
1983.	TURRETTINI, THEODORE	Dec. 19, 1890,	Geneva, Switzerland.
2166.	TUTTLE, DAVID K	Oct. 18, 1889,	Philadelphia.
2163.	TYLER, LYON G	Oct. 18, 1889,	Williamsburg, Va.
1529.	TUNNER, PETER	April 15, 1864,	Leoben, Austria.
1602.	TYNDALL, JOHN	April 17, 1868,	London, England.
2138.	TYSON, JAMES	May 20, 1887,	Philadelphia.
	U		
2185.	UNWIN, WILLIAM C	Dec. 19, 1890,	London, England.
	V		
2000.	VAUX, RICHARD.	Jan'y 18, 1884,	Philadelphia.
2045.	VERE, DE, SCHEELE M.	Oct. 16, 1885,	University of Virginia, Va.
1475.	VIRCHOW, RUDOLPH.	Oct. 17, 1862,	Berlin, Prussia.
1646.	VOGT, CARL	Oct. 15, 1869,	Geneva, Switzerland.
2115.	VON MELTZEL, HUGO	Dec. 17, 1886,	Koloszvar, Hungary.
1670.	VOSE, GEORGE LEONARD.	Oct. 21, 1870,	Boston, Mass.
2186.	VOSSION, LOUIS	Dec. 19, 1890,	Philadelphia.

W

	Name.	*Date of Election.*	*Present Address.*
2034.	WAGNER, SAMUEL	Jan'y 16, 1885,	Philadelphia.
1748.	WAHL, WILLIAM H.	Jan'y 16, 1874,	"
1724.	WALLACE, ALFRED R	April 18, 1873,	Parkston, Dorset, England.
2156.	WARD, LESTER F.	May 17, 1889,	Washington, D. C.
2033.	WEIL, EDWARD HENRY	Jan'y 16, 1885,	Philadelphia.
2028.	WEISBACH, ALBIN	Jan'y 16, 1885,	Freiburg, Saxony.
1639.	WHARTON, JOSEPH.	April 16, 1869,	Philadelphia.
1637.	WHITE, ANDREW D.	April 16, 1869,	Ithaca, N. Y.
1848.	WHITE, ISRAEL C.	Jan'y 18, 1878,	Morgantown, W. Va.
1487.	WHITNEY, JOSIAH DWIGHT	Jan'y 16, 1863,	Cambridge, Mass.
1502.	WHITNEY, WILLIAM DWIGHT.	April 17, 1863,	New Haven, Conn.
1863.	WILDER, BURT GREEN	May 3, 1878,	Ithaca, N. Y.
2151.	WILLIAMS, TALCOTT	May 18, 1888,	Philadelphia.
2178.	WILLIS, HENRY	Feb'y 21, 1890,	"
2150.	WILSON, EDMUND B	Feb'y 17, 1888,	Bryn Mawr, Pa.
2041.	WILSON, JAMES C.	Jan'y 16, 1885,	Philadelphia.
1747.	WILSON, JOSEPH M.	Jan'y 16, 1874,	"
2137.	WILSON, WILLIAM POWELL	May 20, 1887,	"
1896.	WINTHROP, ROBERT C.	Jan'y 16, 1880,	Boston, Mass.
2140.	WIREMAN, HENRY D.	May 20, 1887,	Philadelphia.
1561.	WISTER, OWEN JONES	April 20, 1866,	"
1884.	WOOD, RICHARD.	April 18, 1879,	"
1762.	WOODWARD, HENRY.	July 17, 1874,	London, England.
1751.	WOOTTEN, J. E.	Jan'y 16, 1874,	Reading, Pa.
1854.	WORMLEY, THEODORE G.	Jan'y 18, 1878,	Philadelphia.
1932.	WURTS, CHARLES STEWART	Jan'y 21, 1881,	"
2061.	WYCKOFF, A. B.	Feb'y 19, 1886,	U. S. Navy.

Y

1904.	YARNALL, ELLIS	April 16, 1880,	Philadelphia.
1759.	YOUNG, CHARLES AUGUSTUS	April 17, 1874,	Princeton, N. J.

time be awarded by the Society for the best essay of real merit on the Science and Philosophy of Jurisprudence, and to the preparation of the certificate to be granted to the author of any successful essay.

Fourth. Competitors for the prize shall affix to their essays some motto or name (not the proper name of the author, however), and when the essay is forwarded to the Society, it shall be accompanied by a sealed envelope containing within the proper name of the author, and, on the outside thereof, the motto or name adopted for the essay.

Fifth. At a stated meeting of the Society, in pursuance of the advertisement, all essays received up to that time shall be referred to a Committee of Judges, to consist of five persons, who shall be selected by the Society from nomination of ten persons made by the Standing Committee on the Henry M. Phillips' Prize Essay Fund.

Sixth. All amounts of interest accruing and unexpended on each and every occasion on which no prize shall be awarded, shall be considered and taken as accretions to the principal of the said fund.

Seventh. All essays may be written in English, French, German, Dutch, Italian, Spanish or Latin; but, if any language except English, must be accompanied by an English translation of the same.

Eighth. No treatise or essay shall be entitled to compete for the prize that has been already published or printed, or for which the author has received already any prize, or profit, or honor, of any nature whatsoever.

Ninth. All essays must be clearly and legibly written on only one side of the paper.

Tenth. The literary property of such essays shall be in their authors, subject to the right of the Society to publish the crowned essays in its Transactions or Proceedings.

Eleventh. A Standing Committee, to consist of five members appointed by the President, and *ex officio*, the President and the Treasurer of the Society, shall continue in office during the pleasure

of the Society, and any vacancies that may occur in said Committee shall be filled by new appointment by the President.

Twelfth. The said Committee shall have charge of all matters connected with the management of this endowment and the investment of the same, and shall make such general rules for publishing the terms upon which said prize shall be competed for, and the amount of the said prize, and, if it shall deem it expedient, designate the subjects for competing essays. It shall report annually to the Society, on the first Friday in December, all its transactions, with an account of the investment of the Prize Fund, and of the income and expenditures thereof.

The first prize to be awarded by the Society will be the sum of one thousand dollars, lawful gold coin of the United States of America, and all treatises in competition therefor must be in the possession of the Society before the first day of January, 1893.

☞ Members who have not as yet sent their photographs to the Society will confer a favor by so doing; cabinet size preferred.

☞ Members will please communicate any change of address or inaccuracy in name.

☞ A few sets of the Society's Transactions, New Series, 1818 to 1892, XVII vols., 4to, can be obtained from the Librarian. Price $85.00.